M4A88TD-V EVO

Motherboard

E5889

Second Edition (V2)
May 2010

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Notices

Federal Communications Commission Statement

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

- This device may not cause harmful interference, and
- This device must accept any interference received including interference that may cause undesired operation.

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with manufacturer's instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment to an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

The use of shielded cables for connection of the monitor to the graphics card is required to assure compliance with FCC regulations. Changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

Canadian Department of Communications Statement

This digital apparatus does not exceed the Class B limits for radio noise emissions from digital apparatus set out in the Radio Interference Regulations of the Canadian Department of Communications.

This class B digital apparatus complies with Canadian ICES-003.

REACH

Complying with the REACH (Registration, Evaluation, Authorisation, and Restriction of Chemicals) regulatory framework, we published the chemical substances in our products at ASUS REACH website at http://green.asus.com/english/REACH.htm.

DO NOT throw the motherboard in municipal waste. This product has been designed to enable proper reuse of parts and recycling. This symbol of the crossed out wheeled bin indicates that the product (electrical and electronic equipment) should not be placed in municipal waste. Check local regulations for disposal of electronic products.

DO NOT throw the mercury-containing button cell battery in municipal waste. This symbol of the crossed out wheeled bin indicates that the battery should not be placed in municipal waste.

Safety information

Electrical safety

- To prevent electrical shock hazard, disconnect the power cable from the electrical outlet before relocating the system.
- When adding or removing devices to or from the system, ensure that the power cables for the devices are unplugged before the signal cables are connected. If possible, disconnect all power cables from the existing system before you add a device.
- Before connecting or removing signal cables from the motherboard, ensure that all power cables are unplugged.
- Seek professional assistance before using an adapter or extension cord. These devices could interrupt the grounding circuit.
- Ensure that your power supply is set to the correct voltage in your area. If you are not sure about the voltage of the electrical outlet you are using, contact your local power company.
- If the power supply is broken, do not try to fix it by yourself. Contact a qualified service technician or your retailer.

Operation safety

- Before installing the motherboard and adding devices on it, carefully read all the manuals that came with the package.
- Before using the product, ensure all cables are correctly connected and the power cables are not damaged. If you detect any damage, contact your dealer immediately.
- To avoid short circuits, keep paper clips, screws, and staples away from connectors, slots, sockets and circuitry.
- Avoid dust, humidity, and temperature extremes. Do not place the product in any area where it may become wet.
- Place the product on a stable surface.
- If you encounter technical problems with the product, contact a qualified service technician or your retailer.

About this guide

This user guide contains the information you need when installing and configuring the motherboard.

How this guide is organized

This guide contains the following parts:

- **Chapter 1: Product introduction**

  This chapter describes the features of the motherboard and the new technology it supports.

- **Chapter 2: Hardware information**

  This chapter lists the hardware setup procedures that you have to perform when installing system components. It includes description of the switches, jumpers, and connectors on the motherboard.

- **Chapter 3: BIOS setup**

  This chapter tells how to change system settings through the BIOS Setup menus. Detailed descriptions of the BIOS parameters are also provided.

- **Chapter 4: Software support**

  This chapter describes the contents of the support DVD that comes with the motherboard package and the software.

- **Chapter 5: ATI® CrossFireX™ technology support**

  This chapter describes the ATI® CrossFireX™ feature and shows the graphics card installation procedures.

Where to find more information

Refer to the following sources for additional information and for product and software updates.

1. **ASUS websites**

   The ASUS website provides updated information on ASUS hardware and software products. Refer to the ASUS contact information.

2. **Optional documentation**

   Your product package may include optional documentation, such as warranty flyers, that may have been added by your dealer. These documents are not part of the standard package.

Conventions used in this guide

To ensure that you perform certain tasks properly, take note of the following symbols used throughout this manual.

DANGER/WARNING: Information to prevent injury to yourself when trying to complete a task.

CAUTION: Information to prevent damage to the components when trying to complete a task.

IMPORTANT: Instructions that you MUST follow to complete a task.

NOTE: Tips and additional information to help you complete a task.

Typography

Bold text	Indicates a menu or an item to select.
Italics	Used to emphasize a word or a phrase.
<Key>	Keys enclosed in the less-than and greater-than sign means that you must press the enclosed key. Example: <Enter> means that you must press the Enter or Return key.
<Key1> + <Key2> + <Key3>	If you must press two or more keys simultaneously, the key names are linked with a plus sign (+). Example: <Ctrl> + <Alt> + <Del>

M4A88TD-V EVO specifications summary

CPU	AMD® Socket AM3 for AMD® Phenom™ II / Athlon™ II / Sempron™ 100 Series Processors AMD® 140W CPU Support AMD® Cool 'n' Quiet™ Technology Supports 45nm CPU
Chipset	AMD® 880G / SB850
System bus	Up to 5200 MT/s; HyperTransport™ 3.0
Memory	4 x DIMM, max. 16GB, DDR3 2000 (O.C.) / 1333 / 1066 MHz, ECC / non-ECC, un-buffered memory Dual channel memory architecture * AMD AM3 100 and 200 Series CPU support up to DDR3 1066 MHz. ** When you install a total memory of 4 GB capacity or more, Windows® 32-bit operating system may only recognize less than 3 GB. We recommend using a maximum of 3 GB system memory if you are using a Windows® 32-bit OS. *** Refer to www.asus.com or this user manual for the Memory QVL (Qualified Vendors Lists).
Expansion slots	2 x PCI Express 2.0 x16 slots (blue @ x16 mode, gray @ x4 mode) support ATI® CrossFireX technology 1 x PCI Express 2.0 x1 slot 3 x PCI slots
VGA output	Integrated ATI® Radeon™ HD 4250 GPU Dual independent displays support: • D-Sub & DVI-D • D-Sub & HDMI Supports HDMI with max. resolution 1920 x 1200 (1080P) Supports DVI-D with max. resolution 2560 x 1600 @60Hz Supports RGB with max. resolution 2048 x 1536 @85Hz Supports H.264, VC-1, MPEG-2, DirectX 10.1, and OpenGL 2.0 Supports Shader Model 4.1, Universal Video Decoder (UVD) 2.0 Maximum UMA memory size: 1 GB 128 MB DDR3 1333 sideport memory support ATI® Hybrid CrossFireX™ support
Storage	**AMD® SB850 chipset** - 5 x SATA 6.0 Gb/s ports with RAID 0, 1, 5, and 10 support - 1 x eSATA port (6.0 Gb/s ready) **VIA® VT6330 PATA controller** - 1 x Ultra DMA 133/100/66 for up to 2 PATA devices
LAN	Realtek® 8111E Gigabit LAN controller featuring AI NET2
Audio	ALC892 8-channel High Definition Audio CODEC - BD Audio Layer Content Protection - Supports 192KHz / 24bit True BD Loss-less Sound - Supports Jack-Detection, Multi-Streaming, and Front Panel Jack-Retasking (HD mode only) - Optical S/PDIF Out port at back I/O - ASUS Noise Filter
USB	14 x USB 2.0 ports (8 ports at midboard, 6 ports at the back panel)

(continued on the next page)

M4A88TD-V EVO specifications summary

IEEE 1394	VIA® VT6330 controller supports 2 IEEE 1394a ports (one at midboard, one at the back panel)
ASUS unique features	**ASUS Xtreme Design** ASUS Hybrid Processor – TurboV EVO - TurboV, Auto Tuning, CPU Level UP and GPU Boost ASUS Hybrid OS – Express Gate ASUS Hybrid Switches - Turbo Key II - Core Unlocker **ASUS Power Solutions** - ASUS 8+2 Phase Power Design - ASUS EPU **ASUS Exclusive Features** - MemOK! - Anti-Surge Protection **ASUS Quiet Thermal Solutions** - ASUS Fanless Design: Stylish heatsink solution - ASUS Fan Xpert **ASUS EZ DIY** - ASUS O.C. Profile - ASUS CrashFree BIOS 3 - ASUS EZ Flash 2 - ASUS MyLogo 2™
ASUS exclusive overclocking features	**Intelligent overclocking tools:** - TurboV EVO - GPU Boost - Turbo Key II **Precision Tweaker 2** - vCore: Adjustable CPU voltage at 0.003125V increment - vDIMM: Adjustable DRAM voltage at 0.015V increment - vChipset (N.B.): Adjustable chipset voltage at 0.003125V increment **SFS (Stepless Frequency Selection)** - HT frequency tuning from 100MHz up to 550MHz at 1MHz increment - PCI Express frequency tuning from 100MHz up to 150MHz at 1MHz increment **Overclocking protection** - ASUS C.P.R. (CPU Parameter Recall)

(continued on the next page)

M4A88TD-V EVO specifications summary

Back panel I/O ports	1 x PS/2 keyboard / mouse combo port 1 x HDMI Out port 1 x DVI-D Out port 1 x D-Sub port 1 x Optical S/PDIF Out port 1 x eSATA port 1 x IEEE 1394a port 1 x LAN (RJ-45) port 6 x USB 2.0 ports 8-channel audio I/O ports
Internal connectors / switches / buttons	4 x USB 2.0 connectors support additional 8 USB 2.0 ports 1 x IDE connector 5 x SATA 6.0 Gb/s connectors 1 x CPU fan connector 1 x Chassis fan connector 1 x Power fan connector 1 x IEEE1394a connector 1 x S/PDIF Out header 1 x Core Unlocker switch 1 x Turbo Key II switch 1 x MemOK! button 1 x Front panel audio connector 1 x COM connector 24-pin ATX Power connector 8-pin EATX 12V Power connector 1 x System panel connector
BIOS features	16 Mb Flash ROM, SPI, AMI BIOS, PnP, DMI 2.0, WfM 2.0, SM BIOS 2.5, ACPI 2.0a, ASUS EZ Flash 2, ASUS CrashFree BIOS 3
Manageability	WOL by PME, WOR by PME, WOR by Ring, PXE
Support DVD contents	Drivers ASUS PC Probe II ASUS Update AMD OverDrive (AOD) Anti-virus software (OEM version)
Accessories	1 x Ultra DMA 133/100/66 cable 4 x Serial ATA cables (2 @6 Gb/s, 2 @3 Gb/s) 1 x Q-Connector (retail version only) 1 x Q-Shield 1 x User Manual
Form factor	ATX form factor: 12 in. x 9.6 in. (30.5 cm x 24.4 cm)

***Specifications are subject to change without notice.**

1.1 Welcome!

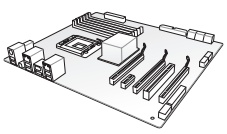
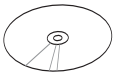
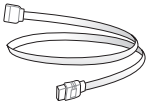
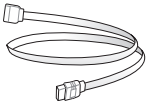
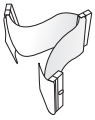
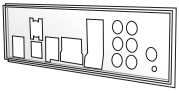
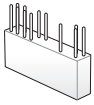
Thank you for buying an ASUS® M4A88TD-V EVO motherboard!

The motherboard delivers a host of new features and latest technologies, making it another standout in the long line of ASUS quality motherboards!

Before you start installing the motherboard, and hardware devices on it, check the items in your package with the list below.

1.2 Package contents

Check your motherboard package for the following items.

		
ASUS M4A88TD-V EVO motherboard	**User guide**	**Support DVD**
		
2 x Serial ATA 6.0 Gb/s cables with 6.0 Gb/s label	**2 x Serial ATA 3.0 Gb/s cables**	**1 x Ultra DMA 133/ 100/66 cable**
		
1 x ASUS Q-Shield	**1 x 2-in-1 ASUS Q-Connector kit**	

- If any of the above items is damaged or missing, contact your retailer.
- The illustrated items above are for reference only. Actual product specifications may vary with different models.

1.3 Special features

1.3.1 Product highlights

AMD® Phenom™ II / Athlon™ II / Sempron™ 100 Series Processors (socket AM3)

This motherboard supports AMD® AM3 multi-core processors with unique L3 cache and delivers better overclocking capabilities with less power consumption. It features dual-channel DDR3 1333 memory support and accelerates data transfer rate up to 5200MT/s via HyperTransport™ 3.0 based system bus. This motherboard also supports AMD® CPUs in the 45nm manufacturing process.

AMD® 880G Chipset

AMD® 880G Chipset is designed to support up to 5200MT/s HyperTransport™ 3.0 (HT 3.0) interface speed and PCI Express™ 2.0 x16 graphics. It is optimized with AMD®'s latest AM3 and multi-core CPUs to provide excellent system performance and overclocking capabilities.

Dual-Channel DDR3 2000 (O.C.) / 1333 / 1066 support

This motherboard supports DDR3 memory that features data transfer rates of 2000 (O.C.) / 1333 / 1066 MHz to meet the higher bandwidth requirements of the latest 3D graphics, multimedia, and Internet applications. The dual-channel DDR3 architecture enlarges the bandwidth of your system memory to boost system performance.

ATI® CrossFireX™ Technology

ATI's CrossFireX™ boosts image quality along with rendering speed, eliminating the need to scale down screen resolution to get high quality images. CrossFireX™ allows higher antialiasing, anisotropic filtering, shading, and texture settings. Adjust your display configurations, experiment with the advanced 3D settings, and check the effects with a real-time 3D-rendered previews within ATI Catalyst™ Control Center.

AMD® SB850 Chipset

The AMD® SB850 Southbridge natively supports the next generation SATA 6.0 Gb/s data transfer rate and PCI Express 2.0 interface.

1.3.2 ASUS Xtreme Design—Hybrid Processor*

TurboV EVO

The ultimate O.C. processor satisfies every level of overclockers—from die-hard enthusiasts to beginners. Auto tuning intelligently pushes the system to the fastest clock speeds while maintaining stability. Turbo Key boosts performance with just one touch; while TurboV offers more options to advanced overclockers to achieve world O.C. record. Moreover, upgrade your CPU at no additional cost with CPU Level UP!

Auto Tuning

Auto Tuning is an intelligent tool that automates overclocking to achieve a total system level up. This tool also provides stability testing. Even O.C. beginners can achieve extreme yet stable overclocking results with Auto Tuning!

GPU Boost

GPU Boost overclocks the integrated GPU in real time for the best graphics performance. User-friendly UI facilitates flexible frequency and voltage adjustments. Its ability to deliver multiple overclocking profiles also provides rapid and stable system-level upgrades.

1.3.3 ASUS Xtreme Design—Hybrid Switches*

Turbo Key II

Enjoy superb performance by auto-tuning your processor to an extreme yet stable state. Simply activate a dedicated switch on the motherboard to unleash extra processing capabilities.

Core Unlocker

ASUS Core Unlocker simplifies the activation of a latent AMD® CPU—with just a simple switch. Enjoy an instant performance boost by simply unlocking the extra cores, without performing complicated BIOS changes.

*** The actual overclocking result depends on the system configuration.**

1.3.4 ASUS Xtreme Design—Hybrid OS

ASUS Express Gate

Express Gate is an ASUS exclusive OS that provides you with quick access to the Internet and key applications before entering the Windows® OS.

1.3.5 ASUS unique features

ASUS Power Solutions

ASUS Power solutions intelligently and automatically provide balanced computing power and energy consumption.

8+2 Phase Power Design

To fully unleash the next-generation AM3 CPU's potential, this motherboard has adopted the brand new 8-phase VRM power design, which delivers high power efficiency and supreme overclocking ability. These high quality power components effectively lower system temperature to ensure longer component lifespan. This motherboard also features an extra 2 phase power dedicated to integrated memory/HT controller.

ASUS EPU

The ASUS EPU (Energy Processing Unit) provides total system power management by detecting current PC loadings and intelligently moderating power usage for critical PC components in real-time–helping save power and money!

MemOK!

Memory compatibility is among the top concerns during computer upgrades. Worry no more. MemOK! is the fastest memory booting solution today. This remarkable memory rescue tool requires nothing but a push of a button to patch memory issues and get your system up and running in no time. The technology is able to determine failsafe settings that can dramatically improve your system booting success.

Anti-Surge Protection

This special design protects expensive devices and the motherboard from damage caused by power surges from switching power supply unit (PSU).

ASUS Quiet Thermal Solutions

ASUS Quiet Thermal solution makes system more stable and enhances the overclocking capability.

Fanless Design: stylish heatsink solution

The brand-new 2-color Wing Heatsink features a 0-dB thermal solution that offers users a noiseless PC environment. The beautifully curved fins not only upgrade the visual enjoyment for motherboard users, but also effectively cools down hot airflows generated by the northbridge chipset. Combined with usability and aesthetics, the ASUS Patent 2-color Wing Heatsink will give users an extremely silent and cooling experience with the elegant appearance!

Fan Xpert

ASUS Fan Xpert intelligently allows you to adjust both the CPU and chassis fan speeds according to different ambient temperatures caused by different climate conditions in different geographic regions and your PC's loading. The built-in variety of useful profiles offer flexible controls of fan speed to achieve a quiet and cool environment.

ASUS EZ DIY

ASUS EZ DIY feature collection provides you with easy ways to install computer components, update the BIOS or back up your favorite settings.

ASUS O.C. Profile

The motherboard features the ASUS O.C. Profile that allows you to conveniently store or load multiple BIOS settings. The BIOS settings can be stored in the CMOS or a separate file, giving you the freedom to share and distribute your favorite settings.

ASUS CrashFree BIOS 3

ASUS CrashFree BIOS 3 allows you to restore corrupted BIOS data from a USB flash disk containing the BIOS file. This protection eliminates the need to buy a replacement ROM chip.

ASUS EZ-Flash 2

ASUS EZ Flash 2 is a user-friendly utility that allows you to update the BIOS without using a bootable floppy disk or an OS-based utility.

Precision Tweaker 2

Allows you to fine-tune the CPU/NB voltage in 0.003125V steps and DRAM voltage in 0.015V steps to achieve the most precise setting for the ultimate overclocking configuration.

Chapter 2

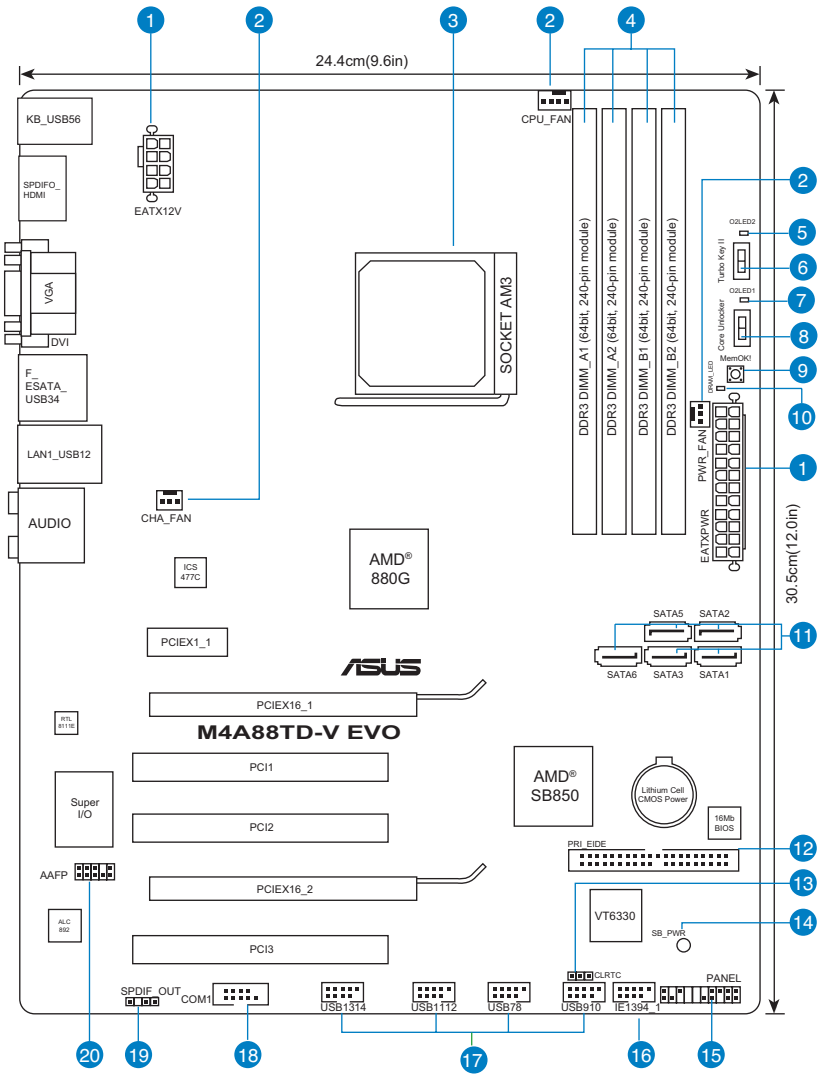
2.1 Before you proceed

Take note of the following precautions before you install motherboard components or change any motherboard settings.

- Unplug the power cord from the wall socket before touching any component.
- Before handling components, use a grounded wrist strap or touch a safely grounded object or a metal object, such as the power supply case, to avoid damaging them due to static electricity.
- Hold components by the edges to avoid touching the ICs on them.
- Whenever you uninstall any component, place it on a grounded antistatic pad or in the bag that came with the component.
- Before you install or remove any component, ensure that the ATX power supply is switched off or the power cord is detached from the power supply. Failure to do so may cause severe damage to the motherboard, peripherals, or components.

2.2 Motherboard overview

2.2.1 Motherboard layout



Refer to **2.8 Connectors** for more information about rear panel connectors and internal connectors.

2.2.2 Layout contents

Connectors/Jumpers/Slots		Page
1.	ATX power connectors (24-pin EATXPWR, 8-pin EATX12V)	2-35
2.	CPU, chassis, and power fan connectors (4-pin CPU_FAN, 3-pin CHA_FAN, 3-pin PWR_FAN)	2-33
3.	AM3 CPU Socket	2-5
4.	DDR3 DIMM slots	2-10
5.	Turbo Key II LED (O2LED2)	2-39
6.	Turbo Key II switch	2-21
7.	Core Unlocker LED (O2LED1)	2-39
8.	Core Unlocker switch	2-23
9.	MemOK! switch	2-22
10.	DRAM LED (DRAM_LED)	2-38
11.	AMD® SB850 Serial ATA 6.0 Gb/s connectors (7-pin SATA1, SATA2, SATA3, SATA5, SATA6)	2-30
12.	IDE connector (40-1 pin PRI_EIDE)	2-29
13.	Clear RTC RAM (3-pin CLRTC)	2-20
14.	Standby power LED (SB_PWR)	2-38
15.	System panel connector (20-8 pin PANEL)	2-36
16.	IEEE 1394a port connector (10-1 pin IE1394_1)	2-31
17.	USB connectors (10-1 pin USB78, USB910, USB1112, USB1314)	2-32
18.	Serial port connector (10-1 pin COM1)	2-31
19.	Digital audio connector (4-1 pin SPDIF_OUT)	2-34
20.	Front panel audio connector (10-1 pin AAFP)	2-34

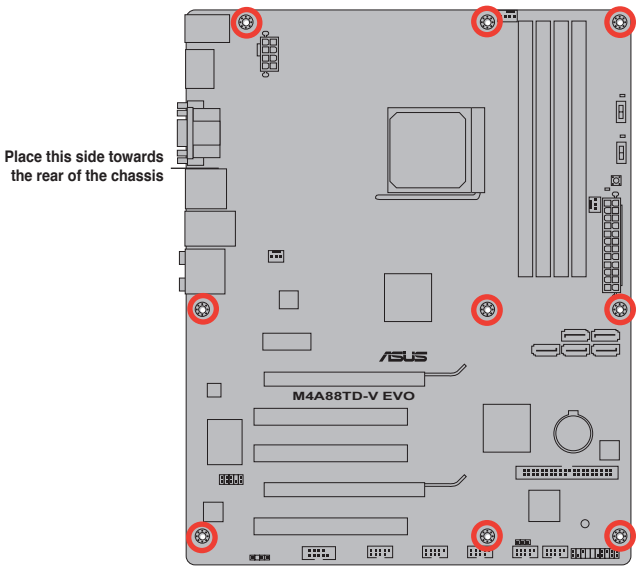
2.2.3 Placement direction

When installing the motherboard, ensure that you place it into the chassis in the correct orientation. The edge with external ports goes to the rear part of the chassis as indicated in the image below.

2.2.4 Screw holes

Place nine screws into the holes indicated by circles to secure the motherboard to the chassis.

DO NOT overtighten the screws! Doing so can damage the motherboard.



2.3 Central Processing Unit (CPU)

The motherboard comes with an AM3 socket designed for AMD® Phenom™ II / Athlon™ II / Sempron™ 100 Series Processors.

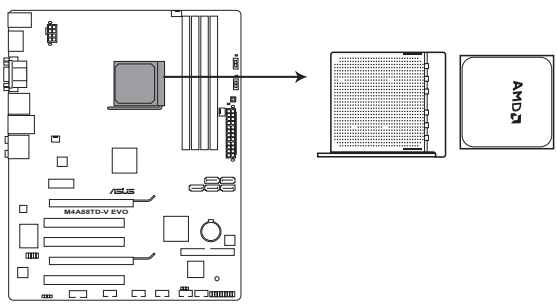
Ensure that all power cables are unplugged before installing the CPU.

The AM3 socket has a different pinout from the 940-pin socket designed for the AMD Opteron processor. Ensure that you use a CPU designed for the AM3 socket. The CPU fits in only one correct orientation. DO NOT force the CPU into the socket to prevent bending the connectors on the socket and damaging the CPU!

2.3.1 Installing the CPU

To install a CPU:

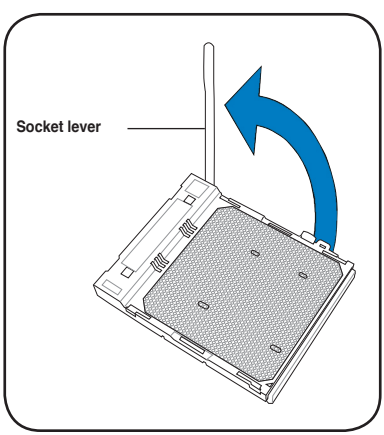
1. Locate the CPU socket on the motherboard.



M4A88TD-V EVO CPU socket AM3

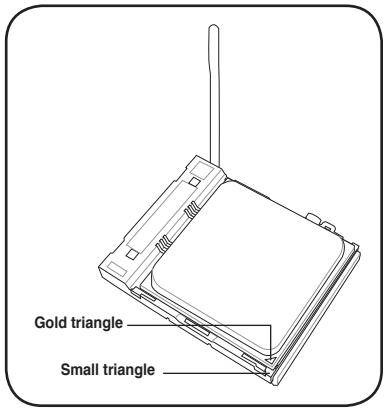
2. Press the lever sideways to unlock the socket, then lift it up to a 90º angle.

Ensure that the socket lever is lifted up to a 90º angle. Otherwise, the CPU will not fit in completely.

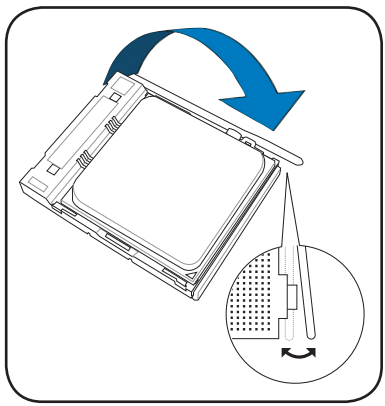


3. Position the CPU above the socket such that the CPU corner with the gold triangle matches the socket corner with a small triangle.

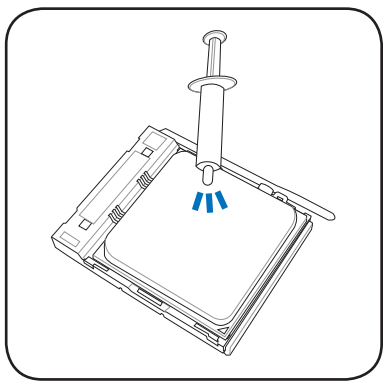
4. Carefully insert the CPU into the socket until it fits in place.



5. When the CPU is in place, push down the socket lever to secure the CPU. The lever clicks on the side tab to indicate that it is locked.



6. Apply some Thermal Interface Material to the exposed area of the CPU that the heatsink will be in contact with, ensuring that it is spread in an even thin layer.



Some heatsinks come with pre-applied thermal paste. If so, skip this step.

The Thermal Interface Material is toxic and inedible. DO NOT eat it. If it gets into your eyes or touches your skin, wash it off immediately, and seek professional medical help.

To prevent contaminating the paste, DO NOT spread the paste with your finger.

2.3.2 Installing the CPU heatsink and fan

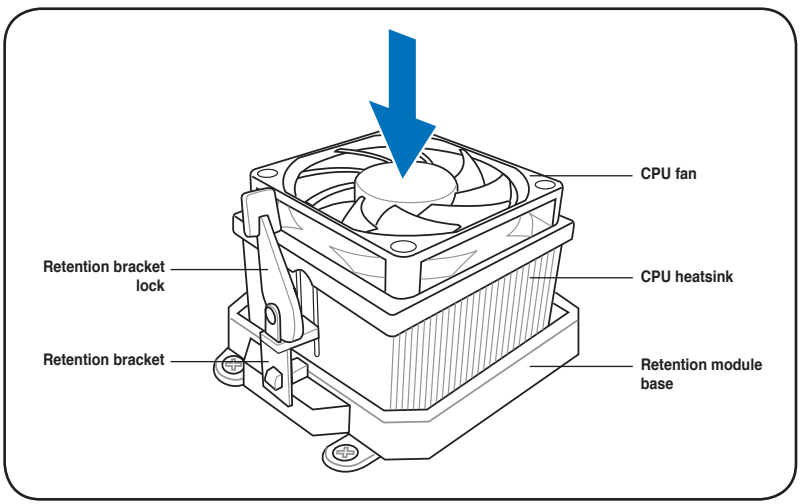
The AMD® AM3 processor requires a specially designed heatsink and fan assembly to ensure optimum thermal condition and performance.

Ensure that you use only AMD-certified heatsink and fan assembly.

To install the CPU heatsink and fan:

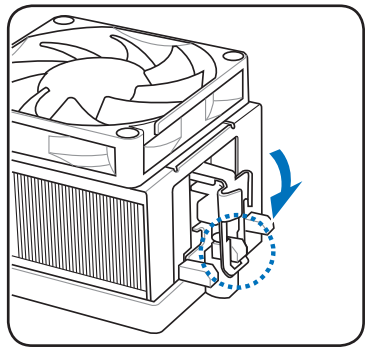
1. Place the heatsink on top of the installed CPU, ensuring that the heatsink fits properly on the retention module base.

- The retention module base is already installed on the motherboard upon purchase.
- You do not have to remove the retention module base when installing the CPU or installing other motherboard components.
- If you purchased a separate CPU heatsink and fan assembly, ensure that a Thermal Interface Material is properly applied to the CPU heatsink or CPU before you install the heatsink and fan assembly.

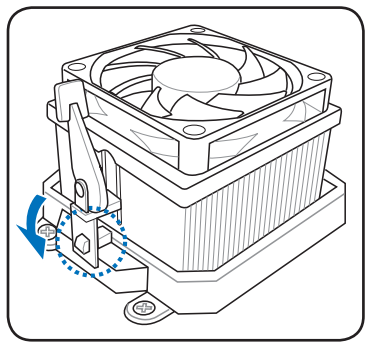


Your boxed CPU heatsink and fan assembly should come with installation instructions for the CPU, heatsink, and the retention mechanism. If the instructions in this section do not match the CPU documentation, follow the latter.

2. Attach one end of the retention bracket to the retention module base.

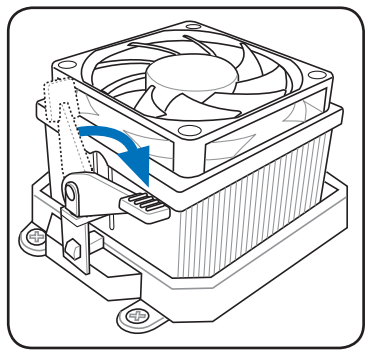


3. Align the other end of the retention bracket to the retention module base. A clicking sound denotes that the retention bracket is in place.

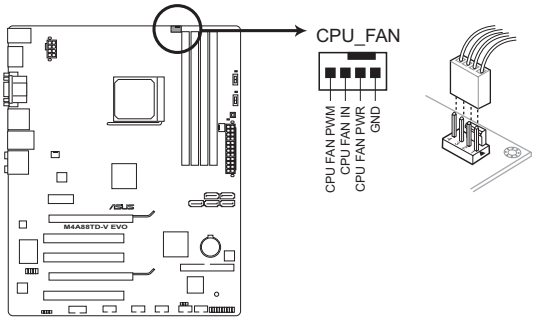


Ensure that the fan and heatsink assembly perfectly fits the retention mechanism module base, otherwise you cannot snap the retention bracket in place.

4. Push down the retention bracket lock on the retention mechanism to secure the heatsink and fan to the module base.



5. When the fan and heatsink assembly is in place, connect the CPU fan cable to the connector on the motherboard labeled CPU_FAN.



M4A88TD-V EVO CPU fan connector

- Do not forget to connect the CPU fan connector! Hardware monitoring errors can occur if you fail to plug this connector.
- This connector is backward compatible with old 3-pin CPU fan.

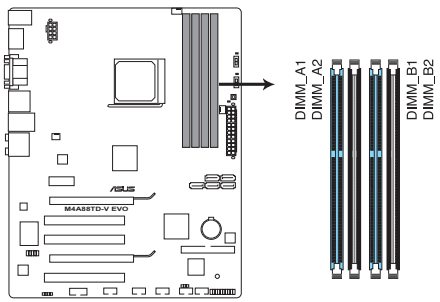
2.4 System memory

2.4.1 Overview

The motherboard comes with four Double Data Rate 3 (DDR3) Dual Inline Memory Modules (DIMM) sockets.

A DDR3 module has the same physical dimensions as a DDR2 DIMM but is notched differently to prevent installation on a DDR2 DIMM socket. DDR3 modules are developed for better performance with less power consumption.

The figure illustrates the location of the DDR3 DIMM sockets:



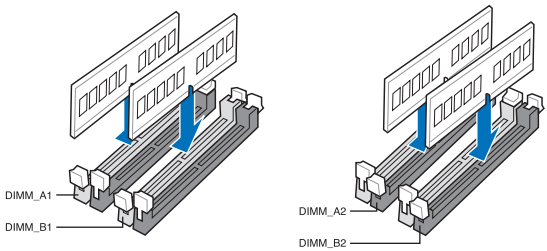
M4A88TD-V EVO 240-pin DDR3 DIMM sockets

Recommended memory configurations

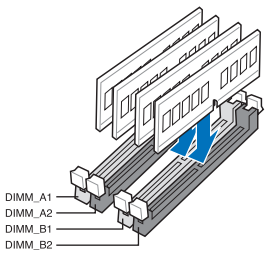
One DIMM:

Install one memory module in any slot as a single-channel operation.

Two DIMMs (dual-channel operation):



Four DIMMs (dual-channel operation):



2.4.2 Memory configurations

You may install 512MB, 1GB, 2GB, and 4GB unbuffered ECC and non-ECC DDR3 DIMMs into the DIMM sockets.

- You may install varying memory sizes in Channel A and Channel B. The system maps the total size of the lower-sized channel for the dual-channel configuration. Any excess memory from the higher-sized channel is then mapped for single-channel operation.
- We recommend that you install the memory modules from the blue slots for better overclocking capability.
- Always install DIMMs with the same CAS latency. For optimum compatibility, we recommend that you obtain memory modules from the same vendor.
- AMD AM3 100 and 200 Series CPU support up to DDR3 1066 MHz.
- When overclocking, some AMD CPUs may not support DDR3 1600 or higher frequency DIMMs.
- Due to the memory address limitation on 32-bit Windows OS, when you install 4GB or more memory on the motherboard, the actual usable memory for the OS can be about 3GB or less. For effective use of memory, we recommend that you do any of the following:
  - Use a maximum of 3GB system memory if you are using a 32-bit Windows OS.
  - Install a 64-bit Windows OS when you want to install 4GB or more on the motherboard.
    For more details, refer to the Microsoft® support site at http://support.microsoft.com/kb/929605/en-us.
- This motherboard does not support DIMMs made up of 512Mb (64MB) chips or less (Memory chip capacity counts in Megabit, 8 Megabit/Mb = 1 Megabyte/MB).

- The default memory operation frequency is dependent on its Serial Presence Detect (SPD), which is the standard way of accessing information from a memory module. Under the default state, some memory modules for overclocking may operate at a lower frequency than the vendor-marked value. To operate at the vendor-marked or at a higher frequency, refer to section **3.5 Ai Tweaker menu** for manual memory frequency adjustment.
- For system stability, use a more efficient memory cooling system to support a full memory load (4 DIMMs) or overclocking condition.

M4A88TD-V EVO Motherboard Qualified Vendors Lists (QVL)
DDR3 2000 (O.C.) MHz capability

Vendor	Part No.	Size	SS/DS	Chip Brand	Chip No.	Timing	Voltage	DIMM support		
								1 DIMM	2 DIMM	4 DIMM
KINGSTON	KHX2000C8D3T1K3/3GX(XMP)	3072MB(kit of 3)	SS	-	-	-	1.65V	•		
KINGSTON	KHX2000C9D3T1K3/3GX(XMP)	3072MB(kit of 3)	SS	-	-	-	1.65V	•		
KINGSTON	KHX2000C8D3T1K3/6GX(XMP)	6144MB(Kit of 3)	DS	-	-	-	1.65V	•		
Transcend	TX2000KLU-4GK(XMP)	4096MB(Kit of 2)	DS	-	-	9-9-9-24	1.65V	•		

- Install the DDR3 2000 DIMM on DIMM_A1 for better overclocking performance.
- When overclocking, some AMD CPUs may not support DDR3 1600 or higher frequency DIMMs.

DDR3 1866 (O.C.) MHz capability

Vendor	Part No.	Size	SS/DS	Chip Brand	Chip No.	Timing	Voltage	DIMM support		
								1 DIMM	2 DIMM	4 DIMM
CORSAIR	CMG6GX3M3A1866C7(XMP)	6144MB(Kit of 3)	DS	-	-	7-8-7-20	1.65V	•	•	
KINGSTON	KHX1866C9D3T1K3/6GX(XMP)	6144MB(Kit of 3)	DS	-	-	-	1.65V	•	•	
OCZ	OCZ3P1866LV4GK	4096MB(Kit of 2)	DS	-	-	9-9-9-27	1.65V	•	•	
OCZ	OCZ3P1866C9LV6GK	6144MB(Kit of 3)	DS	-	-	9-9-9-28	1.65V	•	•	

DDR3 1800 (O.C.) MHz capability

Vendor	Part No.	Size	SS/DS	Chip Brand	Chip No.	Timing	Voltage	DIMM support		
								1 DIMM	2 DIMM	4 DIMM
OCZ	OCZ3P18004GK	4096MB(Kit of 2)	DS	-	-	8-8-8-27	1.9V	•	•	
OCZ	QCZ3P18004GK	4096MB(Kit of 2)	DS	-	-	8-8-8-27	1.9V	•	•	

DDR3 1600 (O.C.) MHz capability

Vendor	Part No.	Size	SS/DS	Chip Brand	Chip No.	Timing	Voltage	DIMM support		
								1 DIMM	2 DIMM	4 DIMM
A-Data	AD31600E001GM(O)U3K	3072MB(Kit of 3)	SS	-	-	8-8-8-24	1.65V-1.85V	•	•	•
A-Data	AD31600X002GMU(XMP)	4096MB(Kit of 2)	DS	-	-	7-7-7-20	1.75-1.85V	•	•	•
CORSAIR	TR3X3G1600C8D(XMP)	3072MB(Kit of 3)	SS	-	-	8-8-8-24	1.65V	•	•	•
CORSAIR	CMX4GX3M2A1600C9(XMP)	4096MB(Kit of 2)	DS	-	-	9-9-9-24	1.65V	•	•	
CORSAIR	CMX4GX3M2A1600C9(XMP)	4096MB(Kit of 2)	DS	-	-	9-9-9-24	1.65V	•	•	•
CORSAIR	TR3X6G1600C8 G(XMP)	6144MB(Kit of 3)	DS	-	-	-	-	•	•	•
CORSAIR	TR3X6G1600C8D G(XMP)	6144MB(Kit of 3)	DS	-	-	8-8-8-24	1.65V	•	•	
CORSAIR	TR3X6G1600C9 G(XMP)	6144MB(Kit of 3)	DS	-	-	9-9-9-24	1.65V	•	•	•
CORSAIR	TR3X6G1600C8D G(XMP)	6144MB(Kit of 3)	DS	-	-	8-8-8-24	1.65V	•	•	•
CORSAIR	CMX8GX3M4A1600C9(XMP)	8192MB(Kit of 4)	DS	-	-	9-9-9-24	1.65V	•	•	•
Crucial	BL12864BA1608.8SFB(XMP)	3072MB(Kit of 3)	SS	-	-	8-8-8-24	1.8V	•	•	•
Crucial	BL12864BE2009.8SFB3(EPP)	3072MB(Kit of 3)	SS	-	-	9-9-9-28	2.0V	•	•	•
Crucial	BL25664BN1608.16FF(XMP)	6144MB(Kit of 3)	DS	-	-	-	-	•	•	
Crucial	BL25664TB1608.K16SF(XMP)	6144MB(Kit of 3)	DS	-	-	8-8-8-24	-	•	•	•
Crucial	BL25664TG1608.K16SF(XMP)	6144MB(Kit of 3)	DS	-	-	8-8-8-24	-	•	•	•
Crucial	BL25664TR1608.K16SF(XMP)	6144MB(Kit of 3)	DS	-	-	8-8-8-24	-	•	•	•
G.SKILL	F3-12800CL9D-2GBNQ(XMP)	2048MB(Kit of 2)	SS	-	-	9-9-9-24	1.5V~1.6V	•	•	•
G.SKILL	F3-12800CL7D-4GBECO(XMP)	4096MB(Kit of 2)	DS	-	-	7-8-7-24	1.35V(low voltage)	•	•	•
G.SKILL	F3-12800CL8D-4GBRM(XMP)	4096MB(Kit of 2)	DS	-	-	8-8-8-24	1.60V	•	•	•
G.SKILL	F3-12800CL9D-4GBECO(XMP)	4096MB(Kit of 2)	DS	-	-	9-9-9-24	1.35V(low voltage)	•	•	•

(continued on the next page)

DDR3 1600 (O.C.) MHz capability

Vendor	Part No.	Size	SS/ DS	Chip Brand	Chip No.	Timing	Voltage	DIMM support		
								1 DIMM	2 DIMM	4 DIMM
G.SkiLL	F3-12800CL8T-6GBPI(XMP)	6144MB(Kit of 3)	DS	-	-	8-8-8-21	1.6-1.65V	•		
G.SKILL	F3-12800CL9T-6GBNQ(XMP)	6144MB(Kit of 3)	DS	-	-	9-9-9-24	1.5V~1.6V	•	•	•
Kingmax	FLGD45F-B8KG9(XMP)	1024MB	SS	Kingmax	KFB8F NGXF -ANX-12A	-	-	•	•	•
Kingmax	FLGD45F-B8MF7 MAEH(XMP)	1024MB	SS	-	-	7	-	•	•	•
Kingmax	FLGE85F-B8KG9(XMP)	2048MB	DS	Kingmax	KFB8F NGXF -ANX-12A	-	-	•	•	•
Kingmax	FLGE85F-B8MF7 MEEH(XMP)	2048MB	DS	-	-	7	-	•	•	
KINGSTON	KHX1600C8D3K2/4GX(XMP)	4096MB(Kit of 2)	DS	-	-	-	1.65V	•	•	•
KINGSTON	KHX1600C8D3T1K2/4GX(XMP)	4096MB(Kit of 2)	DS	-	-	-	1.65V	•	•	•
KINGSTON	KHX1600C9D3K2/4G	4096MB(kit of 2)	DS	-	-	-	1.7-1.9V	•	•	•
KINGSTON	KHX1600C9D3K3/6GX(XMP)	6144MB(Kit of 3)	DS	-	-	-	1.65V	•	•	•
OCZ	OCZ3G1600LV3GK	3072MB(Kit of 3)	SS	-	-	8-8-8-24	1.65V	•	•	
OCZ	OCZ3BE1600C8LV4GK	4096MB(Kit of 2)	DS	-	-	8-8-8-24	1.65V	•	•	•
OCZ	OCZ3BE1600LV4GK	4096MB(Kit of 2)	DS	-	-	7-7-7-24	1.65V	•	•	
OCZ	OCZ3OB1600LV4GK	4096MB(Kit of 2)	DS	-	-	-	1.65V	•	•	•
OCZ	OCZ3P1600LV4GK	4096MB(Kit of 2)	DS	-	-	7-7-7-24	1.65V	•	•	•
OCZ	OCZ3G1600LV6GK	6144MB(Kit of 3)	DS	-	-	8-8-8-24	1.65V	•	•	•
Super Talent	WA160UX6G9	6144MB(Kit of 3)	DS	-	-	9	-	•	•	•
Elixir	M2Y2G64CB8HA9N-DG(XMP)	2048MB	DS	-	-	-	-	•	•	•
Kingtiger	KTG2G1600PG3	2048MB	DS	-	-	-	-	•	•	•
Mushkin	996657(XMP)	4096MB(Kit of 2)	DS	-	-	7-7-7-20	1.95V	•	•	•
Mushkin	998659(XMP)	6144MB(Kit of 3)	DS	-	-	9-9-9-24	1.5~1.6V	•	•	
Mushkin	998659(XMP)	6144MB(Kit of 3)	DS	-	-	9-9-9-24	-	•	•	•
PATRIOT	PGS34G1600LLKA	4096MB(Kit of 2)	DS	-	-	7-7-7-20	1.7V	•	•	•

DDR3 1333MHz capability

Vendor	Part No.	Size	SS/ DS	Chip Brand	Chip No.	Timing	Voltage	DIMM support		
								1 DIMM	2 DIMM	4 DIMM
A-Data	AD31333001GOU	1024MB	SS	A-Data	AD30908C8D-151C E0906	-	-	•	•	•
A-Data	AD31333G001GOU	3072MB(Kit of 3)	SS	-	-	8-8-8-24	1.65-1.85V	•	•	•
A-Data	AD31333002GOU	2048MB	DS	A-Data	AD30908C8D-151C E0903	-	-	•	•	•
A-Data	AD31333G002GMU	2048MB	DS	-	-	8-8-8-24	1.65-1.85V	•	•	•
Apacer	78.A1GC6.9L1	2048MB	DS	APACER	AM5D5808DEWSBG	-	-	•	•	•
CORSAIR	CM3X1024-1333C9DHX	1024MB	SS	-	-	9-9-9-24	1.60V	•	•	
CORSAIR	CM3X1024-1333C9	1024MB	SS	-	-	9-9-9-24	1.60V	•	•	•
CORSAIR	TR3X3G1333C9 G	3072MB(Kit of 3)	SS	-	-	9-9-9-24	1.50V	•	•	•
CORSAIR	TR3X3G1333C9 G	3072MB(Kit of 3)	SS	-	-	9-9-9-24	1.50V	•	•	•
CORSAIR	TR3X3G1333C9	3072MB(Kit of 3)	SS	-	-	9	1.5V	•	•	•
CORSAIR	CM3X1024-1333C9DHX	1024MB	DS	Corsair	-	-	-	•	•	
CORSAIR	CM3X2048-1333C9DHX	2048MB	DS	-	-	-	-	•	•	
CORSAIR	TW3X4G1333C9 G	4096MB(Kit of 2)	DS	-	-	9-9-9-24	1.50V	•	•	•
CORSAIR	CMX8GX3M4A1333C9	8192MB(Kit of 4)	DS	-	-	9-9-9-24	1.50V	•	•	•
Crucial	CT12864BA1339.8FF	1024MB	SS	Micron	9FF22D9KPT	9	-	•	•	•
Crucial	CT12872BA1339.9FF	1024MB	SS	Micron	91F22D9KPT(ECC)	9	-	•	•	•
Crucial	BL12864TA1336.8SFB1	2048MB(Kit of 2)	SS	-	-	6-6-6-20	1.8V	•	•	•
Crucial	CT25664BA1339.16FF	2048MB	DS	Micron	9KF27D9KPT	9	-	•	•	•
Crucial	CT25672BA1339.18FF	2048MB	DS	Micron	91F22D9KPT(ECC)	9	-	•	•	•
Crucial	BL25664ABA1336.16SFB1	4096MB(Kit of 2)	DS	-	-	6-6-6-20	1.8V	•	•	
Crucial	BL25664BA1336.16SFB1	4096MB(Kit of 2)	DS	-	-	6-6-6-20	1.8V	•	•	
Crucial	BL25664BN1337.16FF (XMP)	6144MB(Kit of 3)	DS	-	-	7-7-7-24	1.65V	•	•	•
ELPIDA	EBJ10UE8EDF0-DJ-F	1024MB	SS	ELPIDA	J1108EDSE-DJ-F	-	1.35V (low voltage)	•	•	•
ELPIDA	EBJ21UE8EDF0-DJ-F	2048MB	DS	ELPIDA	J1108EDSE-DJ-F	-	1.35V(low voltage)	•	•	

(continued on the next page)

DDR3 1333MHz capability

Vendor	Part No.	Size	SS/DS	Chip Brand	Chip No.	Timing	Voltage	DIMM support		
								1 DIMM	2 DIMM	4 DIMM
G.SKILL	F3-10600CL7D-2GBPI(XMP)	1024MB	SS	G.SKILL	-	-	-	•	•	•
G.SKILL	F3-10600CL8D-2GBHK	1024MB	SS	G.SKILL	-	-	-	•	•	•
G.SKILL	F3-10600CL9D-2GBPK	1024MB	SS	G.SKILL	-	-	-	•	•	•
G.SKILL	F3-10666CL7T-3GBPK	3072MB(Kit of 3)	SS	-	-	7-7-7-18	1.5~1.6V	•	•	•
G.SKILL	F3-10666CL9T-3GBNQ	3072MB(Kit of 3)	SS	-	-	9-9-9-24	1.5~1.6V	•	•	•
G.SKILL	F3-10600CL9D-2GBNQ	1024MB	DS	G.SKILL	-	-	-	•	•	•
G.SKILL	F3-10666CL8D-4GBECO(XMP)	4096MB(Kit of 2)	DS	-	-	8-8-8 -8-24	1.35V (low voltage)	•	•	
G.SKILL	F3-10666CL8D-4GBHK(XMP)	4096MB(Kit of 2)	DS	-	-	8-8-8-21	1.5-1.6V	•	•	
G.SKILL	F3-10666CL7T-6GBPK(XMP)	6144MB(Kit of 3)	DS	-	-	7-7-7-18	1.5~1.6V	•	•	•
G.SKILL	F3-10666CL9T-6GBNQ	6144MB(Kit of 3)	DS	-	-	9-9-9-24	1.5V~1.6V	•	•	
GEIL	GV32GB1333C9DC	1024MB	SS	-	-	9	-	•	•	•
GEIL	GV34GB1333C7DC	2048MB	DS	-	-	7-7-7-24	1.5V	•	•	
GEIL	GG34GB1333C9DC	4096MB(Kit of 2)	DS	GEIL	GL1L128M88BA12N	9-9-9-24	1.3V (low voltage)	•	•	•
GEIL	GV32GB1333C9SC	6144MB(Kit of 3)	DS	-	-	9	1.5V	•	•	•
Kingmax	FLFD45F-B8MF9	1024MB	SS	Micron	8HD22D9JNM	-	-		•	•
Kingmax	FLFD45F-B8MH9 MAES	1024MB	SS	Micron	9CF22D9KPT	-	-	•	•	•
Kingmax	FLFE85F-B8MH9 MEES	2048MB	DS	Micron	9GF27D9KPT	-	-	•	•	•
KINGSTON	KVR1333D3N9/1G	1024MB	SS	KTC	D1288JELDPGD9U	-	-	•	•	•
KINGSTON	KVR1333D3N9/2G	2048MB	DS	Qimonda	IDSH1G-03A1F1C-13H	-	1.5V	•	•	•
KINGSTON	KVR1333D3N9/4G	4096MB	DS	Hynix	H5TQ2G83AFR	-	-	•	•	•
Micron	MT8JTF12864AZ-1G4F1	1024MB	SS	Micron	9FF22D9KPT	9	-	•	•	•
Micron	MT9JSF 12872AZ-1G4F1	1024MB	SS	Micron	91F22D9KPT(ECC)	9	-	•	•	•
Micron	MT16JTF25664AZ-1G4F1	2048MB	DS	Micron	9KF27D9KPT	9	-	•	•	•
Micron	MT18JSF25672AZ-1G4F1	2048MB	DS	Micron	91F22D9KPT(ECC)	9	-	•	•	•
OCZ	OCZ3X1333LV3GK(XMP)	3072MB(Kit of 3)	SS	-	-	-	1.6V	•	•	•
OCZ	OCZ3P1333LV4GK	4096MB(Kit of 2)	DS	-	-	7-7-7-20	1.65V	•	•	
OCZ	OCZ3P1333LV4GK	4096MB(Kit of 2)	DS	-	-	7-7-7-20	1.65V	•	•	•
OCZ	OCZ3RPX1333EB4GK	4096MB(Kit of 2)	DS	-	-	6-5-5-20	1.85V	•	•	
OCZ	OCZ3X13334GK(XMP)	4096MB(Kit of 2)	DS	-	-	7-7-7-20	1.75V	•	•	•
OCZ	OCZ3G1333LV6GK	6144MB(Kit of 3)	DS	-	-	9-9-9-20	1.65V	•	•	•
OCZ	OCZ3P1333LV6GK	6144MB(Kit of 3)	DS	-	-	7-7-7-20	1.65V	•	•	
OCZ	OCZ3X1333LV6GK(XMP)	6144MB(Kit of 3)	DS	-	-	8-8-8-20	1.60V	•	•	•
PSC	AL7F8G73D-DG1	1024MB	SS	PSC	A3P1GF3DGF928 M9B05	8-8-8-24	1.5V	•	•	•
PSC	AL8F8G73D-DG1	2048MB	DS	PSC	A3P1GF3DGF928 M9B05	8-8-8-24	1.5V	•	•	•
SAMSUNG	M378B2873DZ1-CH9	1024MB	SS	Samsung	K4B1G0846D-HCH9	-	-	•	•	
SAMSUNG	M378B2873DZ1-CH9	1024MB	SS	SAMSUNG	SEC 846 HCH9 K4B1G08460	-	-	•	•	•
SAMSUNG	M378B2873EH1-CH9	1024MB	SS	Samsung	SEC 913 HCH9 K4B1G0846E	-	-	•	•	•
SAMSUNG	M391B2873DZ1-CH9	1024MB	SS	Samsung	K4B1G0846D-HCH9(ECC)	-	-	•	•	•
SAMSUNG	M378B5673DZ1-CH9	2048MB	DS	Samsung	K4B1G0846D-HCH9	-	-	•	•	•
SAMSUNG	M378B5673EH1-CH9	2048MB	DS	Samsung	SEC 913 HCH9 K4B1G0846E	-	-	•	•	•
SAMSUNG	M391B5673DZ1-CH9	2048MB	DS	Samsung	K4B1G0846D-HCH9(ECC)	-	-	•	•	•
Super Talent	W1333X2GB8(XMP)	1024MB	SS	-	-	-	-	•	•	•
Transcend	TS256MLK64V3U	2048MB	DS	Micron	9GF27D9KPT	-	-	•	•	•
ASINT	SLY3128M8-EDJ	1024MB	SS	ASINT	DDRII1208-DJ 0844	-	-	•	•	•
ASINT	SLY3128M8-EDJE	1024MB	SS	ELPIDA	J1108BASE-DJ-E	-	-	•	•	•
ASINT	SLY3128M8-EDJ	2048MB	DS	ASINT	DDRII1208-DJ 0844	-	-	•	•	•
ASINT	SLZ3128M8-EDJE	2048MB	DS	ELPIDA	J1108BASE-DJ-E	-	-	•	•	•
BUFFALO	FSX1333D3G-K2G	1024MB	SS	-	-	7-7-7-20	-	•	•	•
BUFFALO	FSX1333D3G-2G	2048MB	DS	-	-	7-7-7-20	-	•	•	•
Century	PC3-10600 DDR3-1333 9-9-9	1024MB	SS	Micron	8FD22D9JNM	-	-	•	•	
Century	PC3-10600 DDR3-1333 9-9-9	2048MB	DS	Micron	8DD22D9JNM	-	-		•	•
Elixir	M2Y2G64CB8HA9N-CG	2048MB	DS	-	-	7-7-7-20	-	•	•	•

(continued on the next page)

DDR3 1333MHz capability

Vendor	Part No.	Size	SS/DS	Chip Brand	Chip No.	Timing	Voltage	DIMM support		
								1 DIMM	2 DIMM	4 DIMM
Elixir	M2Y2G64CB8HC9N-CG	2048MB	DS	Elixir	-	-	-	•	•	•
Kingtiger	2GB DIMM PC3-10666	2048MB	DS	Samsung	SEC 904 HCH9 K4B1G0846D	-	-	•	•	•
Kingtiger	KTG2G1333PG3	2048MB	DS	-	-	-	-	•	•	•
PATRIOT	PSD31G13332H	1024MB	DS	-	-	9	-	•	•	•
PATRIOT	PSD31G13332	1024MB	DS	Patriot	PM64M8D38U-15	-	-	•	•	•
PATRIOT	PSD32G13332H	2048MB	DS	-	-	-	-	•	•	•
PATRIOT	PDC34G1333ELK	4096MB(Kit of 2)	DS	-	-	9-9-9-24	1.5V			•
SILICON POWER	SP001GBLTU133S01	1024MB	SS	NANYA	NT5CB128M8AN-CG	9	-	•	•	•
SILICON POWER	SP001GBLTU133S02	1024MB	SS	elixir	N2CB1680AN-C6	9	-	•	•	•
SILICON POWER	SP002GBLTU133S02	2048MB	DS	elixir	N2CB1680AN-C6	9	-	•	•	•
TAKEMS	TMS1GB364D081-107EY	1024MB	SS	-	-	7-7-7-20	1.5V	•	•	•
TAKEMS	TMS1GB364D081-138EY	1024MB	SS	-	-	8-8-8-24	1.5V	•	•	•
TAKEMS	TMS2GB364D081-107EY	2048MB	DS	-	-	7-7-7-20	1.5V	•	•	•
TAKEMS	TMS2GB364D081-138EY	2048MB	DS	-	-	8-8-8-24	1.5V	•	•	•
TAKEMS	TMS2GB364D082-138EW	2048MB	DS	-	-	8-8-8-24	1.5V	•	•	•
UMAX	E41302GP0-73BDB	2048MB	DS	UMAX	U2S24D30TP-13	-	-	•	•	•

DDR3 1066MHz capability

Vendor	Part No.	Size	SS/DS	Chip Brand	Chip No.	Timing	Voltage	DIMM support		
								1 DIMM	2 DIMM	4 DIMM
Crucial	CT12864BA1067.8FF	1024MB	SS	Micron	9GF22D9KPT	7	-	•	•	•
Crucial	CT12872BA1067.9FF	1024MB	SS	Micron	9HF22D9KPT(ECC)	7	-	•	•	•
Crucial	CT25664BA1067.16FF	2048MB	DS	Micron	9HF22D9KPT	7	-	•	•	•
Crucial	CT25672BA1067.18FF	2048MB	DS	Micron	9GF22D9KPT(ECC)	7	-	•	•	•
ELPIDA	EBJ51UD8BAFA-AC-E	512MB	SS	Elpida	J5308BASE-AC-E	-	-	•	•	•
ELPIDA	EBJ51UD8BAFA-AE-E	512MB	SS	Elpida	J5308BASE-AC-E	-	-	•	•	•
ELPIDA	EBJ21UE8EDF0-AE-F	2048MB	DS	ELPIDA	J1108EDSE-DJ-F	-	1.35V(low voltage)	•	•	•
KINGSTON	KVR1066D3N7/1G	1024MB	SS	Kingston	D1288JEKAPGA7U	7	1.5V	•	•	•
KINGSTON	KVR1066D3N7/2G	2048MB	DS	Kingston	D1288JEKAPGA7U	7	1.5V	•	•	•
Micron	MT8JTF12864AZ-1G1F1	1024MB	SS	Micron	9GF22D9KPT	7	-	•	•	•
Micron	MT9JSF12872AZ-1G1F1	1024MB	SS	Micron	9HF22D9KPT(ECC)	7	-	•	•	•
Micron	MT16JTF25664AZ-1G1F1	2048MB	DS	Micron	9HF22D9KPT	7	-	•	•	•
Micron	MT18JSF25672AZ-1G1F1	2048MB	DS	Micron	9GF22D9KPT(ECC)	7	-	•	•	•
SAMSUNG	M378B2873EH1-CF8	1024MB	SS	Samsung	SEC 901 HCF8 K4B1G0846E	-	-	•	•	•
Elixir	M2Y2G64CB8HC5N-BE	2048MB	DS	Elixir	N2CB1G80CN-BE	-	-	•	•	•
Elixir	M2Y2G64CBHA9N-BE	2048MB	DS	-	-	7-7-7-20	-	•	•	•
Elixir	M2Y2G64CBHC9N-BE	2048MB	DS	Elixir	-	-	-	•	•	•
Kingtiger	2GB DIMM PC3-8500	2048MB	DS	Hynix	H5TQ1G83AFP G7C	-	-	•	•	

Side(s): SS - Single-sided DS - Double-sided
DIMM support:

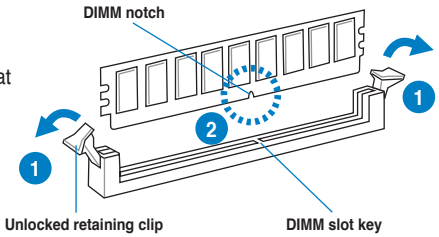
- **1 DIMM:** Supports one (1) module inserted into any slot as Single-channel memory configuration.
- **2 DIMMs:** Supports two (2) modules inserted into either the blue slots or the black slots as one pair of Dual-channel memory configuration.
- **4 DIMMs:** Supports four (4) modules inserted into both the blue and the black slots as two pairs of Dual-channel memory configuration.

Visit the ASUS website for the latest QVL.

2.4.3 Installing a DIMM

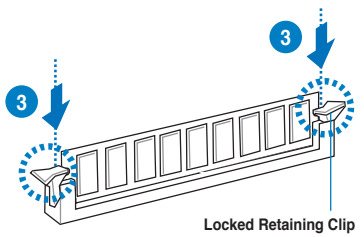
Ensure to unplug the power supply before adding or removing DIMMs or other system components. Failure to do so may cause severe damage to both the motherboard and the components.

1. Unlock a DIMM socket by pressing the retaining clips outward.
2. Align a DIMM on the socket such that the notch on the DIMM matches the DIMM slot key on the socket.



A DIMM is keyed with a notch so that it fits in only one direction. DO NOT force a DIMM into a socket in the wrong direction to avoid damaging the DIMM.

3. Hold the DIMM by both of its ends, then insert the DIMM vertically into the socket. Apply force to both ends of the DIMM simultaneously until the retaining clip snaps back into place, and the DIMM cannot be pushed in any further to ensure proper sitting of the DIMM.

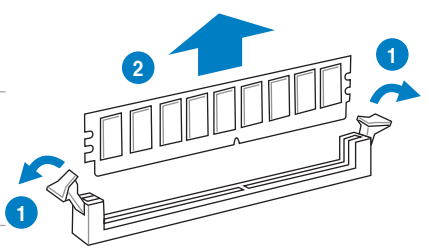


Always insert the DIMM into the socket VERTICALLY to prevent DIMM notch damage.

2.4.4 Removing a DIMM

1. Simultaneously press the retaining clip outward to unlock the DIMM.

Support the DIMM lightly with your fingers when pressing the retaining clips. The DIMM might get damaged when it flips out with extra force.



2. Remove the DIMM from the socket.

2.5 Expansion slots

In the future, you may need to install expansion cards. The following subsections describe the slots and the expansion cards that they support.

Ensure to unplug the power cord before adding or removing expansion cards. Failure to do so may cause you physical injury and damage motherboard components.

2.5.1 Installing an expansion card

To install an expansion card:

1. Before installing the expansion card, read the documentation that came with it and make the necessary hardware settings for the card.
2. Remove the system unit cover (if your motherboard is already installed in a chassis).
3. Remove the bracket opposite the slot that you intend to use. Keep the screw for later use.
4. Align the card connector with the slot and press firmly until the card is completely seated on the slot.
5. Secure the card to the chassis with the screw you removed earlier.
6. Replace the system cover.

2.5.2 Configuring an expansion card

After installing the expansion card, configure it by adjusting the software settings.

1. Turn on the system and change the necessary BIOS settings, if any. See Chapter 3 for information on BIOS setup.
2. Assign an IRQ to the card. Refer to the tables on the next page.
3. Install the software drivers for the expansion card.

When using PCI cards on shared slots, ensure that the drivers support “Share IRQ” or that the cards do not need IRQ assignments. Otherwise, conflicts will arise between the two PCI groups, making the system unstable and the card inoperable. Refer to the table on the next page for details.

2.5.3 Interrupt assignments

Standard interrupt assignments

IRQ	Priority	Standard function
0	1	System Timer
1	2	Keyboard Controller
2	–	Redirect to IRQ#9
4	12	Communications Port (COM1)*
5	13	IRQ Holder for PCI Steering*
6	14	Reserved
7	15	Reserved
8	3	System CMOS/Real Time Clock
9	4	IRQ Holder for PCI Steering*
10	5	IRQ Holder for PCI Steering*
11	6	IRQ Holder for PCI Steering*
12	7	Reserved
13	8	Numeric Data Processor
14	9	Primary IDE Channel

*** These IRQs are usually available for PCI devices.**

IRQ assignments for this motherboard

	A	B	C	D	E	F	G	H
PCIE x16_1	–	–	shared	–	–	–	–	–
PCIE x16_2	shared	–	–	–	–	–	–	–
PCIE x1_1	shared	–	–	–	–	–	–	–
PCI_1	–	–	–	–	shared	–	–	–
PCI_2	–	–	–	–	–	shared	–	–
PCI_3	–	–	–	–	–	–	shared	–
LAN	–	–	shared	–	–	–	–	–
Onboard 880G Video Controller	–	–	shared	–	–	–	–	–
Onchip SATA Controller	–	–	–	shared	–	–	–	–
Onboard PATA Controller	–	shared	–	–	–	–	–	–
1394 Controller	–	shared	–	–	–	–	–	–
HD Audio	shared	–	–	–	–	–	–	–

2.5.4 PCI slots

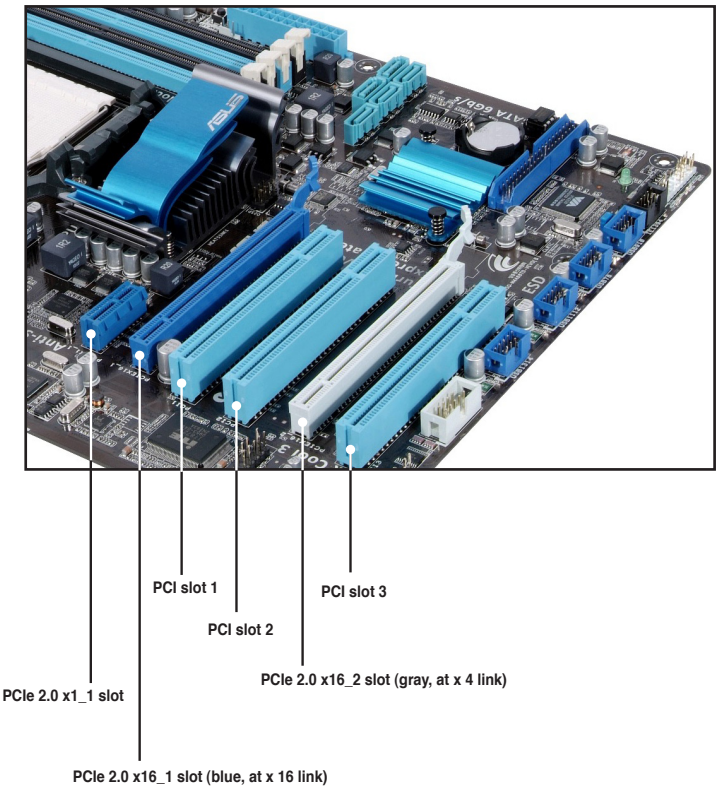
The PCI slots support cards such as a LAN card, SCSI card, USB card, and other cards that comply with PCI specifications. Refer to the figure below for the location of the slots.

2.5.5 PCI Express 2.0 x1 slot

This motherboard supports PCI Express x1 network cards, SCSI cards and other cards that comply with the PCI Express specifications. Refer to the figure below for the location of the slots.

2.5.6 PCI Express 2.0 x16 slots

This motherboard has two PCI Express 2.0 x16 slots that support PCI Express 2.0 x16 graphics cards complying with the PCI Express specifications. Refer to the figure below for the location of the slots.



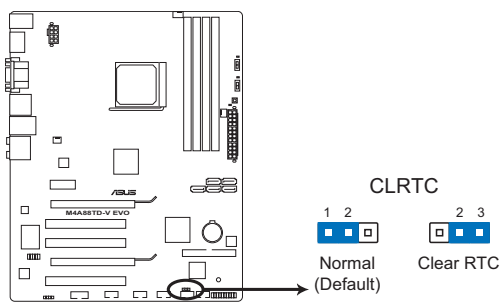
VGA configuration	PCI Express operating mode	
	PCIe x16_1	PCIe x16_2
Single VGA/PCIe card	x16 (Recommended for single VGA card)	N/A
Dual VGA/PCIe card	x16	x4

- In single VGA card mode, use first the PCIe 2.0 x16_1 slot (blue) for a PCI Express x16 graphics card to get better performance.
- We recommend that you provide sufficient power when running CrossFireX™ mode. See page 2-35 for details.
- Connect a chassis fan to the motherboard connector labeled CHA_FAN when using multiple graphics cards for better thermal environment. See page 2-33 for details.

2.6 Jumper

Clear RTC RAM (3-pin CLRTC)

This jumper allows you to clear the Real Time Clock (RTC) RAM in CMOS. You can clear the CMOS memory of date, time, and system setup parameters by erasing the CMOS RTC RAM data. The onboard button cell battery powers the RAM data in CMOS, which include system setup information such as system passwords.



M4A88TD-V EVO Clear RTC RAM

To erase the RTC RAM

1. Turn OFF the computer and unplug the power cord.
2. Move the jumper cap from pins 1-2 (default) to pins 2-3. Keep the cap on pins 2-3 for about 5–10 seconds, then move the cap back to pins 1-2.
3. Plug the power cord and turn ON the computer.
4. Hold down the <Del> key during the boot process and enter BIOS setup to re-enter data.

Except when clearing the RTC RAM, never remove the cap on CLRTC jumper default position. Removing the cap will cause system boot failure!

- If the steps above do not help, remove the onboard battery and move the jumper again to clear the CMOS RTC RAM data. After clearing the CMOS, reinstall the battery.
- You do not need to clear the RTC when the system hangs due to overclocking. For system failure due to overclocking, use the C.P.R. (CPU Parameter Recall) feature. Shut down and reboot the system so the BIOS can automatically reset parameter settings to default values.

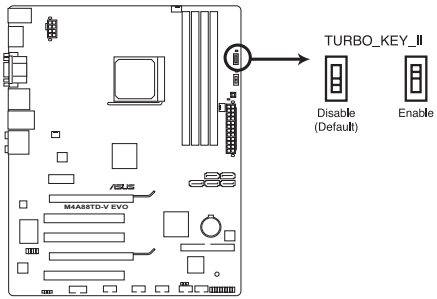
2.7 Onboard switches

Onboard switches allow you to fine-tune performance when working on a bare or open-case system. This is ideal for overclockers and gamers who continually change settings to enhance system performance.

1. Turbo Key II switch

This switch allows you to auto-tune your CPU to enhance the system performance.

For ensuring the system performance, turn the switch setting to **Enable** when the system is powered off.

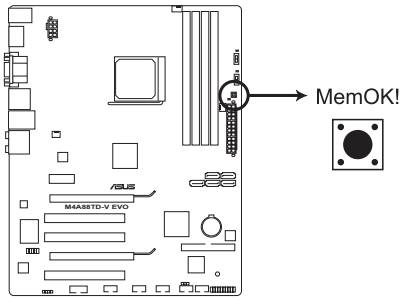


M4A88TD-V EVO Turbo Key II switch

- The **O2LED2** LED near the Turbo Key II switch lights when the switch setting is turned to **Enable**. Refer to section **2.9 Onboard LEDs** for the exact location of the **O2LED2** LED.
- If you clear the CMOS or load the BIOS setup defaults, the related overclocking items in the BIOS menu follow the current setting of the Turbo Key II switch.
- If you change the switch setting to **Enable** under the OS environment, the Turbo Key II function will be activated after the next system bootup.
- You may use the TurboV Auto Tuning, overclock in the BIOS setup program, and enable the Turbo Key II function at the same time. However, the system will use the last setting you have made.

2. MemOK! switch

Installing DIMMs that are incompatible with the motherboard may cause system boot failure, and the DRAM_LED near the MemOK! switch lights continuously. Press and hold the MemOK! switch until the DRAM_LED starts blinking to begin automatic memory compatibility tuning for successful boot.



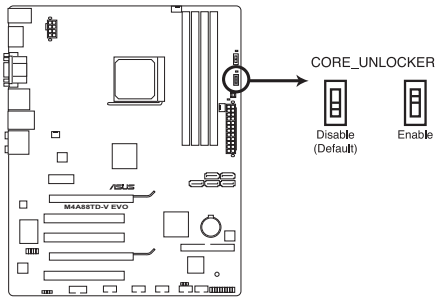
M4A88TD-V EVO MemOK! switch

- Refer to section **2.9 Onboard LEDs** for the exact location of the DRAM_LED.
- The DRAM_LED also lights when the DIMM is not properly installed. Turn off the system and reinstall the DIMM before using the MemOK! function.
- The MemOK! switch does not function under Windows® OS environment.
- During the tuning process, the system loads and tests failsafe memory settings. It takes about 30 seconds for the system to test one set of failsafe settings. If the test fails, the system reboots and test the next set of failsafe settings. The blinking speed of the DRAM_LED increases, indicating different test processes.
- Due to memory tuning requirement, the system automatically reboots when each timing set is tested. If the installed DIMMs still fail to boot after the whole tuning process, the DRAM_LED lights continuously. Replace the DIMMs with ones recommended in the Memory QVL (Qualified Vendors Lists) in this user manual or on the ASUS website at www.asus.com.
- If you turn off the computer and replace DIMMs during the tuning process, the system continues memory tuning after turning on the computer. To stop memory tuning, turn off the computer and unplug the power cord for about 5–10 seconds.
- If your system fail to boot due to BIOS overclocking, press the MemOK! switch to boot and load BIOS default settings. A message will appear during POST reminding you that the BIOS has been restored to its default settings.
- We recommend that you download and update to the latest BIOS version from the ASUS website at www.asus.com after using the MemOK! function.

3. Core Unlocker switch

This switch allows you to unlock the extra cores of your CPU.

For ensuring the system performance, turn the switch setting to **Enable** when the system is powered off.

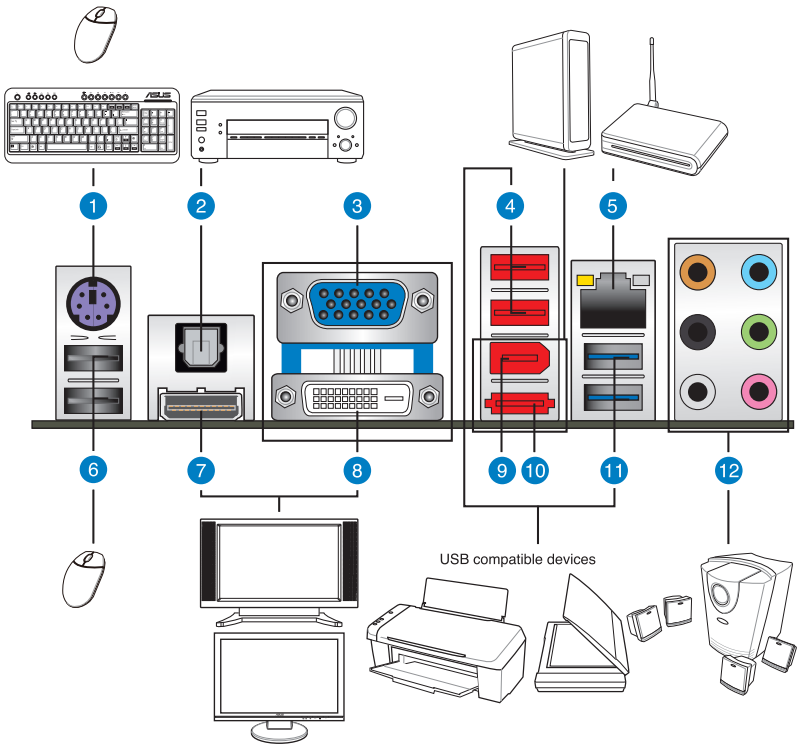


M4A88TD-V EVO Core Unclocker switch

- The **O2LED1** LED near the Core Unlocker switch lights when the switch setting is turned to **Enable**. Refer to section **2.9 Onboard LEDs** for the exact location of the **O2LED1** LED.
- If you clear the CMOS or load the BIOS setup defaults, the **ASUS Core Unlocker** item in the BIOS menu follows the current setting of the Core Unlocker switch.
- You may also press <4> during the Power-On-Self-Test (POST) to activate the Core Unlocker function.
- The system will use the last setting you have made.

2.8 Connectors

2.8.1 Rear panel connectors



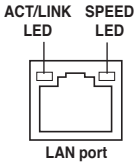
Rear panel connectors	
1. PS/2 keyboard/Mouse Combo port (purple)	7. HDMI Out port***
2. Optical S/PDIF Out port	8. DVI-D Out pot
3. D-Sub Out port	9. IEEE 1394a port
4. USB 2.0 ports 3 and 4	10. External SATA port
5. LAN (RJ-45) port*	11. USB 2.0 ports 1 and 2
6. USB 2.0 ports 5 and 6	12. Audio I/O ports**

***and **: Refer to the tables on the next page for LAN port and audio port definitions.**
*****: Refer to the notes and troubleshooting on HDTV overscaling or underscaling on the next pages.**

- DO NOT insert a different connector to the external SATA port.
- To use hot plugging, set the **SATA Port1 - Port4** item in the BIOS to **[AHCI]**. Refer to **3.4.2 SATA Configuration** for details.

* LAN port LED indications

Activity Link LED		Speed LED	
Status	Description	Status	Description
OFF	No link	OFF	10 Mbps connection
ORANGE	Linked	ORANGE	100 Mbps connection
BLINKING	Data activity	GREEN	1 Gbps connection



** Audio 2, 4, 6, or 8-channel configuration

Port	Headset 2-channel	4-channel	6-channel	8-channel
Light Blue	Line In	Line In	Line In	Line In
Lime	Line Out	Front Speaker Out	Front Speaker Out	Front Speaker Out
Pink	Mic In	Mic In	Mic In	Mic In
Orange	–	–	Center/Subwoofer	Center/Subwoofer
Black	–	Rear Speaker Out	Rear Speaker Out	Rear Speaker Out
Gray	–	–	–	Side Speaker Out

Dual display table

This table indicates whether the dual display you want to use is supported or not.

Dual display output	Supported	Not supported
DVI + D-Sub	•	
HDMI + D-Sub	•	
DVI + HDMI		•

Playback of Blu-Ray Discs

For better playback quality, we suggest that you follow the system requirements in the suggested list below.

Suggested list	
CPU	AMD® Phenom II X4 955
DIMM	DDR3 1333
BIOS setup	Frame Buffer Size – 256MB or higher
Playback software	CyberLink® PowerDVD 9

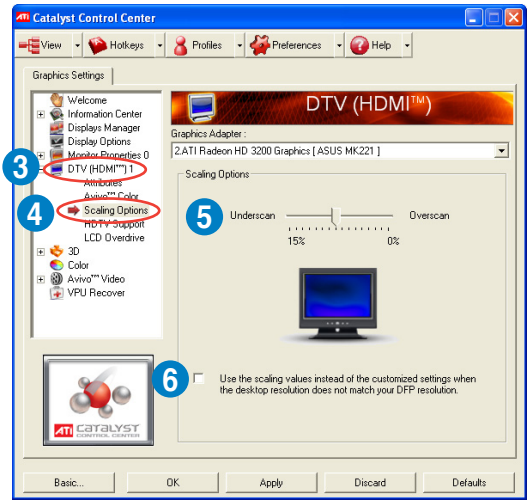
File format	Best resolution		
	Windows XP	Windows Vista	Windows 7
Non-protected clips	1920 x 1080p	1920 x 1080p	1920 x 1080p
Blu-ray	1920 x 1080p	1920 x 1080p	1920 x 1080p

Troubleshooting on HDTV overscaling or underscaling:

If your desktop is extending beyond the viewable display area or the desktop or image is not filling the entire display area while using the onboard HDMI out port and the HDMI cable, you can resize the desktop appearing on your HDTV screen.

To resize your HDTV desktop:

1. Install **AMD Chipset Driver** from the motherboard support DVD.
2. Right-click the desktop and select **ATI CATALYST(R) Control Center**.
3. From the **Graphics Settings** tree, expand **DTV (HDMI™) 1**.
4. Click **Scaling Options**.
5. Move the **Underscan/Overscan** slider to adjust the overall size of the display on the HDMI™ DTV.
   Using this slider increases or decreases any black borders that may be visible around the outside of the display.

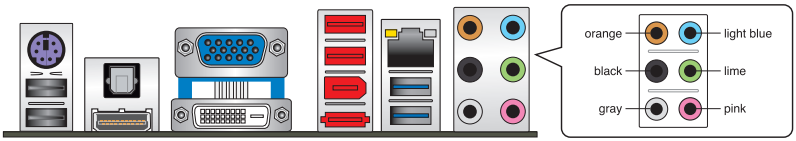


6. To ensure that forcing a custom display mode through the ATI Displays Manager does not create conflicting resolutions, select the **Use the scaling values instead of the customized settings when the desktop resolution does not match your DFP resolution** check box.

The **Scaling Options** function of the **DTV (HDMI™) 1** item in the ATI CATALYST Control Center is adjustable only when you are using an HDTV compliance resolution such as 480i, 720i, or 1080i.

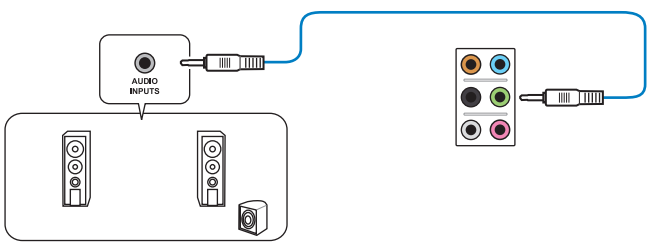
2.8.2 Audio I/O connections

Audio I/O ports

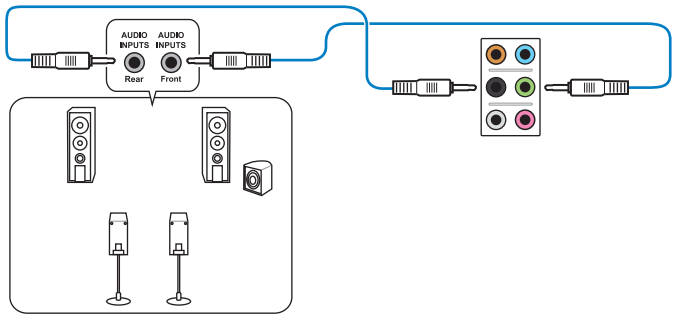


Connect to Headphone and Mic

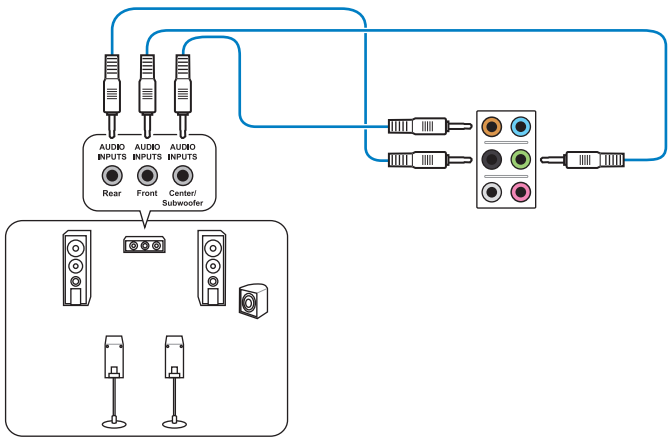
Connect to Stereo / 2.1-channel Speakers



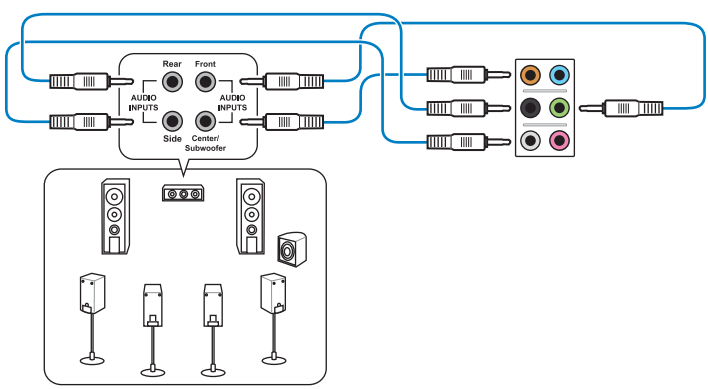
Connect to 4.1 channel Speakers



Connect to 5.1 channel Speakers



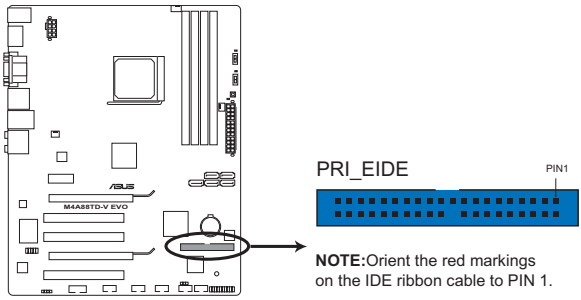
Connect to 7.1 channel Speakers



2.8.3 Internal connectors

1. IDE connector (40-1 pin PRI_EIDE)

The onboard IDE connector is for the Ultra DMA 133/100/66 signal cable. There are three connectors on each Ultra DMA 133/100/66 signal cable: blue, black, and gray. Connect the blue connector to the motherboard's IDE connector, then select one of the following modes to configure your device.



M4A88TD-V EVO IDE connector

	Drive jumper setting	Mode of device(s)	Cable connector
Single device	Cable-Select or Master	-	Black
Two devices	Cable-Select	Master	Black
		Slave	Gray
	Master	Master	Black or gray
	Slave	Slave	

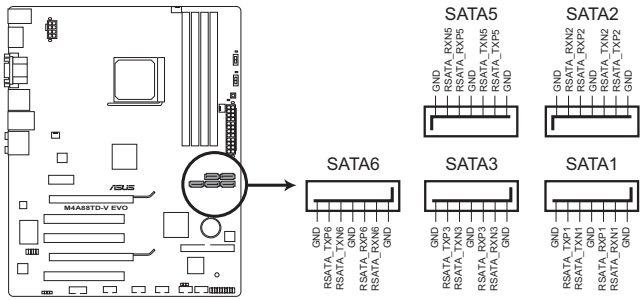
- Pin 20 on the IDE connector is removed to match the covered hole on the Ultra DMA cable connector. This prevents incorrect insertion when you connect the IDE cable.
- Use the 80-conductor IDE cable for Ultra DMA 133/100/66 IDE devices.

If any device jumper is set as "Cable-Select", ensure that all other device jumpers have the same setting.

2. AMD® SB850 Serial ATA Serial ATA 6.0 Gb/s connectors (7-pin SATA 1/2/3/5/6)

These connectors are for the Serial ATA 6.0 Gb/s signal cables for Serial ATA hard disk drives and optical disc drives.

If you installed Serial ATA hard disk drives, you can create a RAID 0, RAID 1, RAID 5, or RAID 10 configuration through the onboard AMD® SB850 controller.

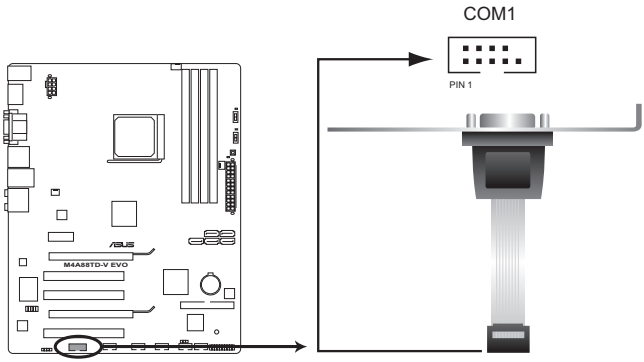


M4A88TD-V EVO SATA connectors

- These connectors are set to **IDE** mode by default. In **IDE** mode, you can connect Serial ATA boot/data hard disk drives to these connectors. If you intend to create a Serial ATA RAID set using these connectors, set the type of the SATA connectors to **[RAID]** in the BIOS. See section **3.4.2 SATA Configuration** for details.
- You must install Windows® XP Service Pack 2 or later version before using Serial ATA hard disk drives. The Serial ATA RAID feature is available only if you are using Windows® XP SP2 or later version.
- When using hot-plug and NCQ, set the type of the SATA connectors to **[AHCI]** in the BIOS. See section **3.4.2 SATA Configuration** for details.

3. Serial port connector (10-1 pin COM1)

This connector is for a serial (COM) port. Connect the serial port module cable to this connector, then install the module to a slot opening at the back of the system chassis.

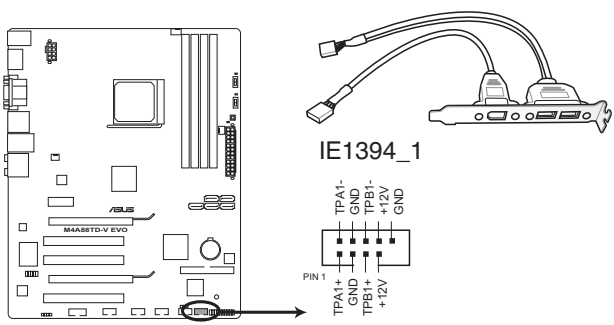


M4A88TD-V EVO Serial port (COM1) connector

The COM module is purchased separately.

4. IEEE 1394a port connector (10-1 pin IE1394_1)

This connector is for an IEEE 1394a port. Connect the IEEE 1394a module cable to this connector, then install the module to a slot opening at the back of the system chassis.



M4A88TD-V EVO IEEE 1394a Connector

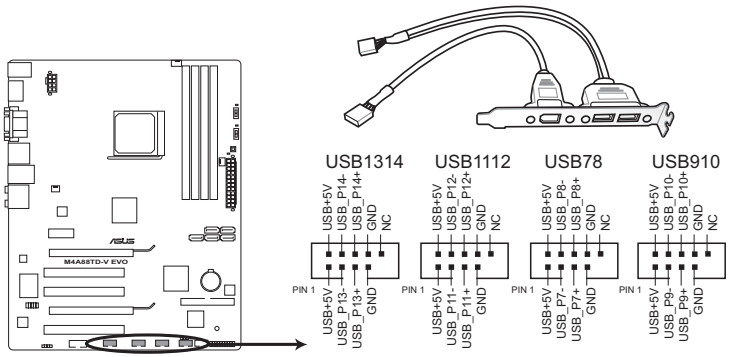
Never connect a USB cable to the IEEE 1394a connector. Doing so will damage the motherboard!

The IEEE 1394a module is purchased separately.

Chapter 2

5. USB connectors (10-1 pin USB78; USB910; USB1112; USB1314)

These connectors are for USB 2.0 ports. Connect the USB module cable to any of these connectors, then install the module to a slot opening at the back of the system chassis. These USB connectors comply with USB 2.0 specification that supports up to 480 Mbps connection speed.



M4A88TD-V EVO USB2.0 connectors

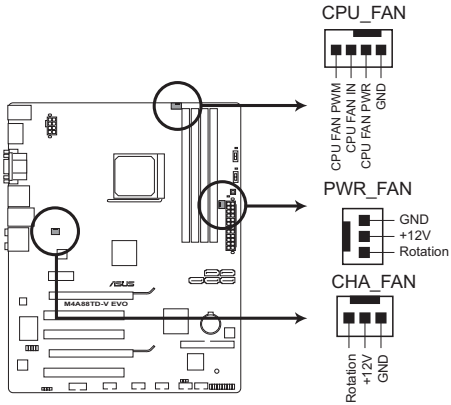
Never connect a 1394 cable to the USB connectors. Doing so will damage the motherboard!

You can connect the front panel USB cable to the ASUS Q-Connector (USB, blue) first, and then install the Q-Connector (USB) to the USB connector onboard if your chassis supports front panel USB ports.

The USB module cable is purchased separately.

6. CPU, chassis, and power fan connectors (4-pin CPU_FAN; 3-pin CHA_FAN; 3-pin PWR_FAN)

Connect the fan cables to the fan connectors on the motherboard, ensuring that the black wire of each cable matches the ground pin of the connector.



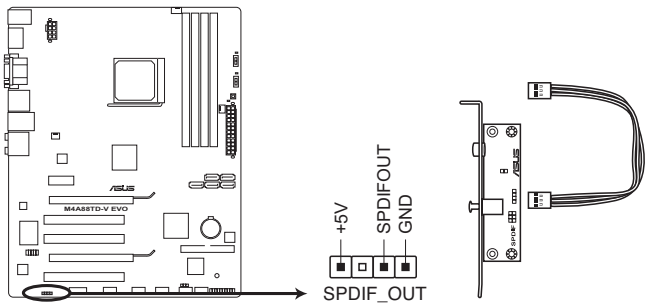
M4A88TD-V EVO fan connectors

Do not forget to connect the fan cables to the fan connectors. Insufficient air flow inside the system may damage the motherboard components. These are not jumpers! Do not place jumper caps on the fan connectors!

- The CPU_FAN connector supports the CPU fan of maximum 2A (24 W) fan power.
- Only the 4-pin CPU_FAN and 3-pin CHA_FAN connectors support the ASUS Fan Xpert feature.
- If you install two VGA cards, we recommend that you plug the rear chassis fan cable to the motherboard connector labeled CHA_FAN for better thermal environment.

7. Digital audio connector (4-1 pin SPDIF_OUT)

This connector is for an additional Sony/Philips Digital Interface (S/PDIF) port. Connect the S/PDIF Out module cable to this connector, then install the module to a slot opening at the back of the system chassis.

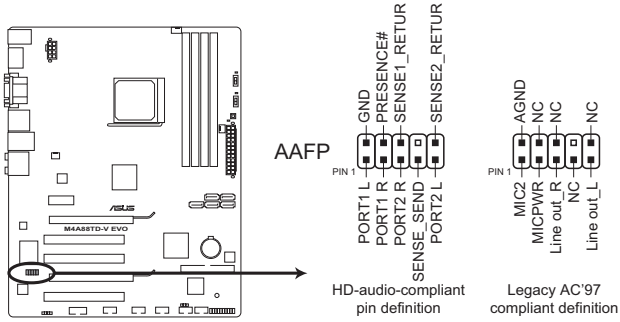


M4A88TD-V EVO Digital audio connector

The S/PDIF module is purchased separately.

8. Front panel audio connector (10-1 pin AAFP)

This connector is for a chassis-mounted front panel audio I/O module that supports either HD Audio or legacy AC`97 audio standard. Connect one end of the front panel audio I/O module cable to this connector.

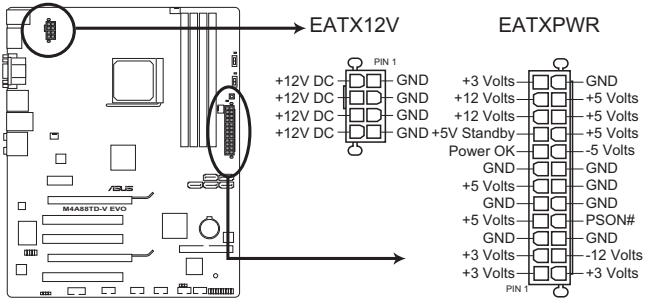


M4A88TD-V EVO Front panel audio connector

- We recommend that you connect a high-definition front panel audio module to this connector to avail of the motherboard's high-definition audio capability.
- If you want to connect a high-definition front panel audio module to this connector, set the **Front Panel Select** item in the BIOS setup to **[HD Audio]**; if you want to connect an AC'97 front panel audio module to this connector, set the item to **[AC 97]**. By default, this connector is set to [HD]. Refer to **3.6.3 Onboard Devices Configuration** for details.

9. ATX power connectors (24-pin EATXPWR; 8-pin EATX12V)

These connectors are for ATX power supply plugs. The power supply plugs are designed to fit these connectors in only one orientation. Find the proper orientation and push down firmly until the connectors completely fit.

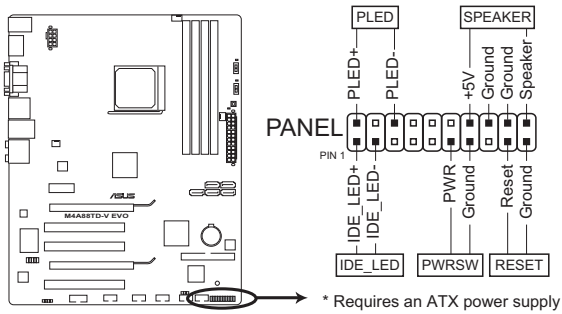


M4A88TD-V EVO ATX power connectors

- For a fully configured system, we recommend that you use a power supply unit (PSU) that complies with ATX 12 V Specification 2.0 (or later version) and provides a minimum power of 450 W.
- Do not forget to connect the 4-pin/8-pin EATX12 V power plug; otherwise, the system will not boot.
- We recommend that you use a PSU with higher power output when configuring a system with more power-consuming devices. The system may become unstable or may not boot up if the power is inadequate.
- If you are uncertain about the minimum power supply requirement for your system, refer to the **Recommended Power Supply Wattage Calculator** at http://support.asus.com/PowerSupplyCalculator/PSCalculator.aspx?SLanguage=en-us for details.
- If you want to use two high-end PCI Express x16 cards, use a PSU with 1000W power or above to ensure the system stability.

10. System panel connector (20-8 pin PANEL)

This connector supports several chassis-mounted functions.



M4A88TD-V EVO System panel connector

- **System power LED (2-pin PLED)**

  This 2-pin connector is for the system power LED. Connect the chassis power LED cable to this connector. The system power LED lights up when you turn on the system power, and blinks when the system is in sleep mode.

- **Hard disk drive activity LED (2-pin IDE_LED)**

  This 2-pin connector is for the HDD Activity LED. Connect the HDD Activity LED cable to this connector. The IDE LED lights up or flashes when data is read from or written to the HDD.

- **System warning speaker (4-pin SPEAKER)**

  This 4-pin connector is for the chassis-mounted system warning speaker. The speaker allows you to hear system beeps and warnings.

- **ATX power button/soft-off button (2-pin PWRSW)**

  This connector is for the system power button.

- **Reset button (2-pin RESET)**

  This 2-pin connector is for the chassis-mounted reset button for system reboot without turning off the system power.

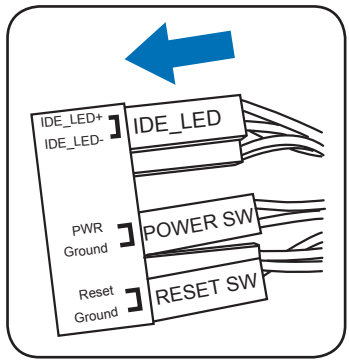
2.8.4. ASUS Q-Connector (system panel)

Use the ASUS Q-Connector to connect/disconnect the chassis front panel cables.

To install the ASUS Q-Connector:

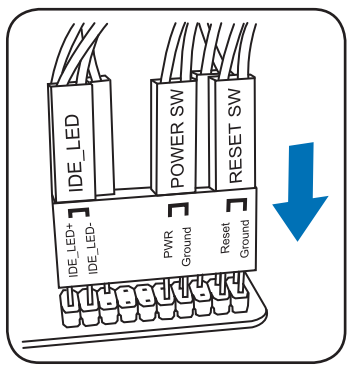
1. Connect the front panel cables to the ASUS Q-Connector.

   Refer to the labels on the Q-Connector to know the detailed pin definitions, and then match them to their respective front panel cable labels.

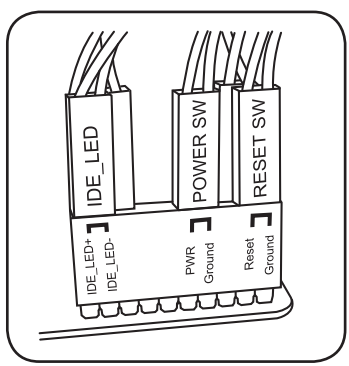


The labels on the front panel cables may vary depending on the chassis model.

2. Install the ASUS Q-Connector to the system panel connector, ensuring the orientation matches the labels on the motherboard.



3. The front panel functions are now enabled. The figure shows the Q-Connector is properly installed on the motherboard.

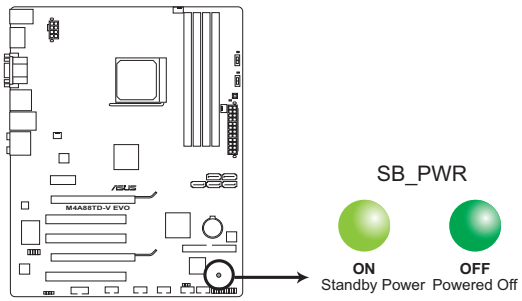


Chapter 2

2.9 Onboard LEDs

1. Standby Power LED

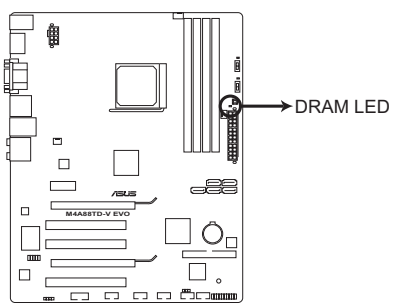
The motherboard comes with a standby power LED. The green LED lights up to indicate that the system is ON, in sleep mode, or in soft-off mode. This is a reminder that you should shut down the system and unplug the power cable before removing or plugging in any motherboard component. The illustration below shows the location of the onboard LED.



M4A88TD-V EVO Onboard LED

2. DRAM LED

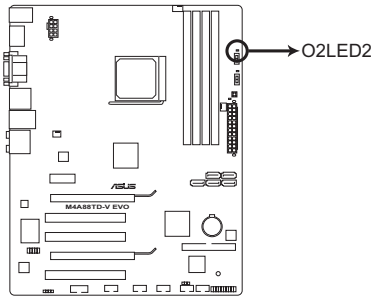
DRAM LED checks the DRAM in sequence during motherboard booting process. If an error is found, the LED next to the error device will continue lighting until the problem is solved. This user-friendly design provides an intuitional way to locate the root problem within a second.



M4A88TD-V EVO DRAM LED

3. Turbo Key II LED

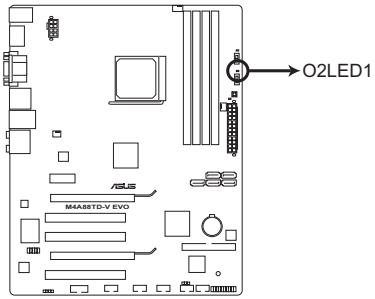
The Turbo Key II LED lights when the Turbo Key II switch is turned to **Enable**.



M4A88TD-V EVO Turbo Key II LED

4. Core Unlocker LED

The Core Unlocker LED lights when the Core Unclocker switch is turned to **Enable**.



M4A88TD-V EVO Core Unlocker LED

The Core Unlocker LED keeps on lighting even though the **ASUS Core Unlocker** item in the BIOS menu is set to **[Disabled]**.

2.10 Starting up for the first time

1. After making all the connections, replace the system case cover.
2. Be sure that all switches are off.
3. Connect the power cord to the power connector at the back of the system chassis.
4. Connect the power cord to a power outlet that is equipped with a surge protector.
5. Turn on the devices in the following order:
   a. Monitor
   b. External SCSI devices (starting with the last device on the chain)
   c. System power
6. After applying power, the system power LED on the system front panel case lights up. For systems with ATX power supplies, the system LED lights up when you press the ATX power button. If your monitor complies with the “green” standards or if it has a “power standby” feature, the monitor LED may light up or change from orange to green after the system LED turns on.

   The system then runs the power-on self tests or POST. While the tests are running, the BIOS beeps (see the BIOS beep codes table below) or additional messages appear on the screen. If you do not see anything within 30 seconds from the time you turned on the power, the system may have failed a power-on test. Check the jumper settings and connections or call your retailer for assistance.

BIOS Beep	Description
One short beep	VGA detected Quick boot set to disabled No keyboard detected
One continuous beep followed by two short beeps then a pause (repeated)	No memory detected
One continuous beep followed by three short beeps	No VGA detected
One continuous beep followed by four short beeps	Hardware component failure

7. At power on, hold down the <Delete> key to enter the BIOS Setup. Follow the instructions in Chapter 3.

2.11 Turning off the computer

While the system is ON, pressing the power switch for less than four seconds puts the system on sleep mode or soft-off mode, depending on the BIOS setting. Pressing the power switch for more than four seconds lets the system enter the soft-off mode regardless of the BIOS setting. Refer to section **3.7 Power menu** in Chapter 3 for details.

Chapter 3

3.1 Knowing BIOS

BIOS (Basic Input and Output System) stores system hardware settings such as storage device configuration, overclocking settings, advanced power management, and boot device configuration that are needed for system startup in the motherboard CMOS. In normal circumstances, the default BIOS settings apply to most conditions to ensure optimum performance. **We recommend that you not change the default BIOS settings** except in the following circumstances:

- An error message appears on the screen during the system bootup and requests you to run the BIOS Setup.
- You have installed a new system component that requires further BIOS settings or update.

Inappropriate settings of the BIOS may result to instability or failure to boot. **We strongly recommend that you change the BIOS settings only with the help of a trained service personnel**.

3.2 Updating BIOS

The ASUS website publishes the latest BIOS versions to provide enhancements on system stability, compatibility, or performance. However, BIOS updating is potentially risky. If there is no problem using the current version of BIOS, **DO NOT manually update the BIOS**. Inappropriate BIOS updating may result in the system's failure to boot. Carefully follow the instructions of this chapter to update your BIOS if necessary.

Visit the ASUS website (www.asus.com) to download the latest BIOS file for this motherboard.

The following utilities allow you to manage and update the motherboard BIOS setup program.

1. **ASUS Update:** Updates the BIOS in Windows® environment.
2. **ASUS EZ Flash 2:** Updates the BIOS using a USB flash drive.
3. **ASUS CrashFree BIOS 3 utility:** Restores the BIOS using the motherboard support DVD or a USB flash drive when the BIOS file fails or gets corrupted.
4. **ASUS BIOS Updater:** Updates and backups the BIOS in DOS environment using the motherboard support DVD and a USB flash drive.

Refer to the corresponding sections for details on these utilities.

Save a copy of the original motherboard BIOS file to a USB flash disk in case you need to restore the BIOS in the future. Copy the original motherboard BIOS using the **ASUS Update** utility.

3.2.1 ASUS Update utility

The ASUS Update is a utility that allows you to manage, save, and update the motherboard BIOS in Windows® environment. The ASUS Update utility allows you to:

- Save the current BIOS file
- Download the latest BIOS file from the Internet
- Update the BIOS from an updated BIOS file
- Update the BIOS directly from the Internet
- View the BIOS version information

This utility is available in the support DVD that comes with the motherboard package.

ASUS Update requires an Internet connection either through a network or an Internet Service Provider (ISP).

Installing ASUS Update

To install ASUS Update:

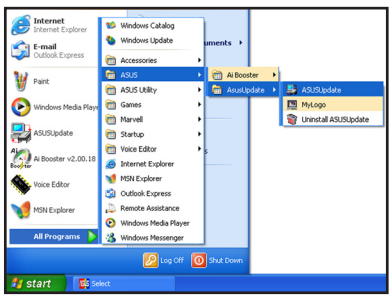
1. Place the support DVD in the optical drive.
2. From the **Main** menu, click the **Utilities** tab, then click **Install ASUS Update VX.XX.XX**.
3. The ASUS Update utility is copied to your system.

Quit all Windows® applications before you update the BIOS using this utility.

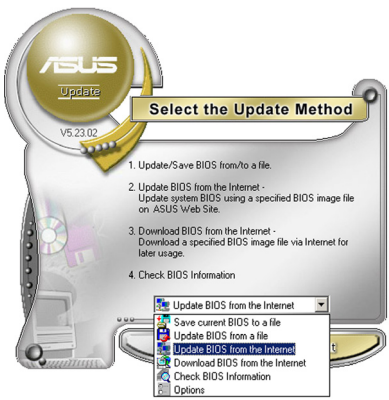
Updating the BIOS through the Internet

To update the BIOS through the Internet:

1. From the Windows® desktop, click **Start > Programs > ASUS > ASUSUpdate > ASUSUpdate.** The ASUS Update main window appears.



2. Select **Update BIOS from the Internet** from the drop-down menu, and then click **Next**.

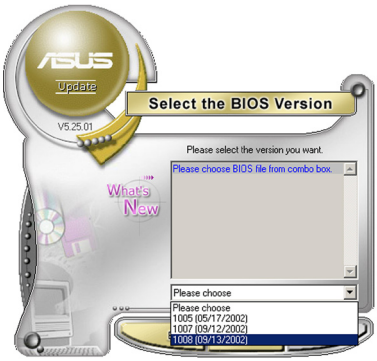

ASUS
Update
V5.23.02
Select the Update Method
1. Update/Save BIOS from/to a file.
2. Update BIOS from the Internet -
Update system BIOS using a specified BIOS image file on ASUS Web Site.
3. Download BIOS from the Internet -
Download a specified BIOS image file via Internet for later usage.
4. Check BIOS Information
Update BIOS from the Internet
Save current BIOS to a file
Update BIOS from a file
Update BIOS from the Internet
Download BIOS from the Internet
Check BIOS Information
Options

Chapter 3

3. Select the ASUS FTP site nearest you to avoid network traffic, or click **Auto Select**. Click **Next**.

Update
V5.23.02
Select the Update Server
Before Continue, please make sure that your system is connected to the Internet. You can then choose a web site by yourself or click AutoSelect button. ASUS Update will choose the best site based on network traffic automatically for you.
Passive
Proxy Setting
Auto Select
ftp.asus.com.tw
Back
Cancel
Next

4. From the FTP site, select the BIOS version that you wish to download. Click **Next**.



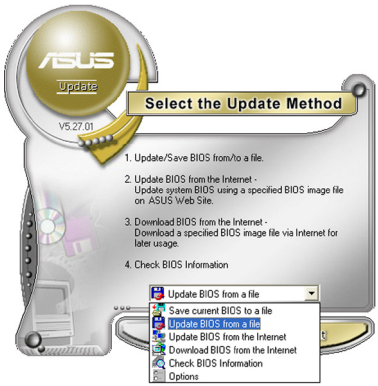
5. Follow the onscreen instructions to complete the update process.

The ASUS Update utility is capable of updating itself through the Internet. Always update the utility to avail all its features.

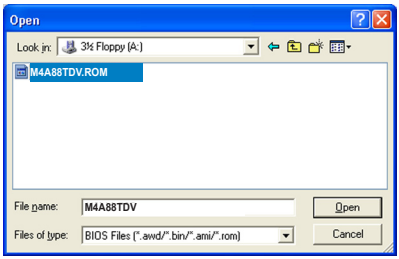
Updating the BIOS through a BIOS file

To update the BIOS through a BIOS file:

1. Fom the Windows® desktop, click **Start** > **Programs** > **ASUS** > **ASUSUpdate** > **ASUSUpdate**. The ASUS Update main window appears.
2. Select **Update BIOS from a file** from the dropdown menu, then click **Next**.


Update
V5.27.01
Select the Update Method
1. Update/Save BIOS from/to a file.
2. Update BIOS from the Internet - Update system BIOS using a specified BIOS image file on ASUS Web Site.
3. Download BIOS from the Internet - Download a specified BIOS image file via Internet for later usage.
4. Check BIOS Information
Update BIOS from a file
Save current BIOS to a file
Update BIOS from a file
Update BIOS from the Internet
Download BIOS from the Internet
Check BIOS Information
Options

3. Locate the BIOS file from the Open window, then click **Open**.
4. Follow the onscreen instructions to complete the update process.



Ensure to load the BIOS default settings to ensure system compatibility and stability. Select the **Load Setup Defaults** item under the Exit menu. See section **3.10 Exit Menu** for details.

Chapter 3

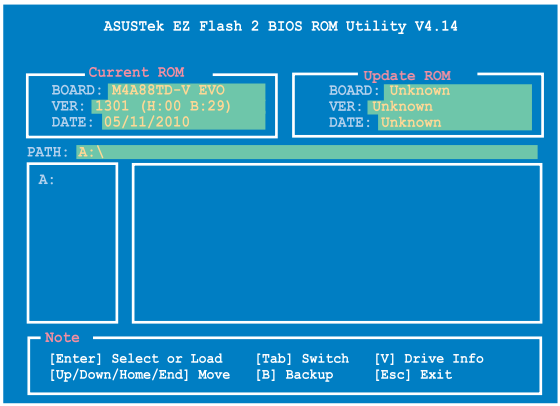
3.2.2 ASUS EZ Flash 2 utility

The ASUS EZ Flash 2 feature allows you to update the BIOS without having to use a bootable floppy disk or an OS-based utility.

Before you start using this utility, download the latest BIOS from the ASUS website at www.asus.com.

To update the BIOS using EZ Flash 2:

1. Insert the USB flash disk that contains the latest BIOS file to the USB port, and then launch EZ Flash 2 in any of these two ways:
   - Press <Alt> + <F2> during POST to display the following.
   - Enter the BIOS setup program. Go to the **Tools** menu to select **EZ Flash 2** and press <Enter> to enable it.



2. Press <Tab> to switch between drives until the correct BIOS file is found. When the correct BIOS file is found, EZ Flash 2 performs the BIOS update process and automatically reboots the system when done.

- This function can support devices such as a USB flash disk with FAT 32/16 format and single partition only.
- DO NOT shut down or reset the system while updating the BIOS to prevent system boot failure!

Ensure to load the BIOS default settings to ensure system compatibility and stability. Select the **Load Setup Defaults** item under the **Exit** menu. See section **3.10 Exit Menu** for details.

3.2.3 ASUS CrashFree BIOS 3 utility

The ASUS CrashFree BIOS 3 utility is an auto recovery tool that allows you to restore the BIOS file when it fails or gets corrupted during the updating process. You can restore a corrupted BIOS file using the motherboard support DVD or a USB flash drive that contains the BIOS file.

- Before using this utility, rename the BIOS file in the USB flash drive into **M4A88TDV.ROM**.
- The BIOS file in the motherboard support DVD may be older than the BIOS file published on the ASUS official website. If you want to use the newer BIOS file, download the file at support.asus.com and save it to a USB flash drive.

Recovering the BIOS

To recover the BIOS:

1. Turn on the system.
2. Insert the motherboard support DVD to the optical drive, or the USB flash drive containing the BIOS file to the USB port.
3. The utility automatically checks the devices for the BIOS file. When found, the utility reads the BIOS file and starts flashing the corrupted BIOS file.
4. Turn off the system after the utility completes the updating process and power on again.
5. The system requires you to enter BIOS Setup to recover BIOS setting. To ensure system compatibility and stability, we recommend that you press <F2> to load default BIOS values.

DO NOT shut down or reset the system while updating the BIOS! Doing so can cause system boot failure!

3.2.4 ASUS BIOS Updater

The ASUS BIOS Updater allows you to update BIOS in DOS environment. This utility also allows you to copy the current BIOS file that you can use as a backup when the BIOS fails or gets corrupted during the updating process.

The succeeding utility screens are for reference only. The actual utility screen displays may not be same as shown.

Before updating BIOS

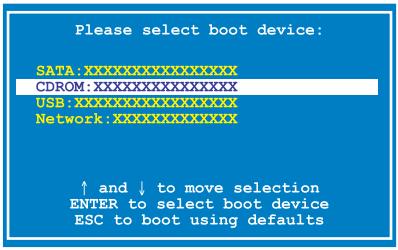
1. Prepare the motherboard support DVD and a USB flash drive in FAT32/16 format and single partition.
2. Download the latest BIOS file and BIOS Updater from the ASUS website at http://support.asus.com and save them on the USB flash drive.

- NTFS is not supported under DOS environment. Do not save the BIOS file and BIOS Updater to a hard disk drive or USB flash drive in NTFS format.
- Do not save the BIOS file to a floppy disk due to low disk capacity.

3. Turn off the computer and disconnect all SATA hard disk drives (optional).

Booting the system in DOS environment

1. Insert the USB flash drive with the latest BIOS file and BIOS Updater to the USB port.
2. Boot your computer. When the ASUS Logo appears, press <F8> to show the **BIOS Boot Device Select Menu**. Insert the support DVD into the optical drive and select the optical drive as the boot device.



3. When the **Make Disk** menu appears, select the **FreeDOS command prompt** item by pressing the item number.
4. At the FreeDOS prompt, type **d:** and press <Enter> to switch the disk from Drive C (optical drive) to Drive D (USB flash drive).

```
Welcome to FreeDOS (http://www.freedos.org)!
C:\>d:
D:\>
```

Backing up the current BIOS

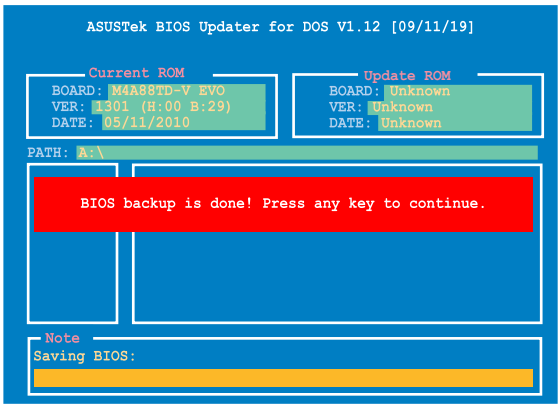
To back up the current BIOS file using the BIOS Updater:

Ensure that the USB flash drive is not write-protected and has enough free space to save the file.

1. At the FreeDOS prompt, type **bupdater /o[filename]** and press <Enter>.

The [filename] is any user-assigned filename with no more than eight alphanumeric characters for the filename and three alphanumeric characters for the extension.

2. The BIOS Updater backup screen appears indicating the BIOS backup process. When BIOS backup is done, press any key to return to the DOS prompt.



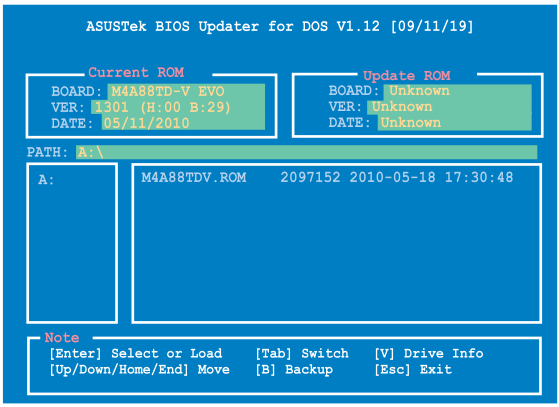
Updating the BIOS file

To update the BIOS file using BIOS Updater:

1. At the FreeDOS prompt, type **bupdater /pc /g** and press <Enter>.

```
D:\>bupdater /pc /g
```

2. The BIOS Updater screen appears as below.



3. Press <Tab> to switch between screen fields and use the <Up/Down/Home/End> keys to select the BIOS file and press <Enter>. BIOS Updater checks the selected BIOS file and prompts you to confirm BIOS update.

4. Select **Yes** and press <Enter>. When BIOS update is done, press <ESC> to exit BIOS Updater. Restart your computer.

DO NOT shut down or reset the system while updating the BIOS to prevent system boot failure!

- Load the BIOS default settings to ensure system compatibility and stability. Select the **Load Setup Defaults** item under the **Exit** BIOS menu.
- Ensure to connect all SATA hard disk drives after updating the BIOS file if you have disconnected them.

3.3 BIOS setup program

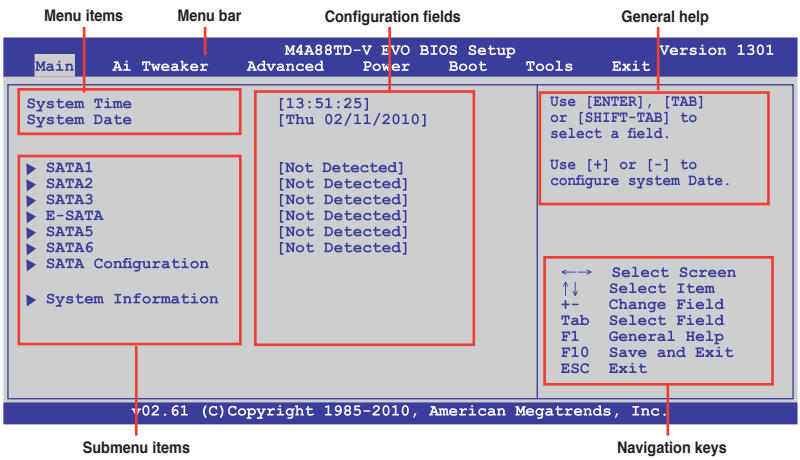
A BIOS Setup program is provided for BIOS item modification. When you start up the computer, the system provides you with the opportunity to run this program. Press <Del> during the Power-On Self-Test (POST) to enter the Setup utility. Otherwise, POST continues with its test routines.

If you wish to enter Setup after POST, restart the system by pressing <Ctrl> + <Alt> + <Delete>, or by pressing the reset button on the system chassis. You can also restart by turning the system off and then back on. Do this last option only if the first two failed.

The Setup program is designed to make it as easy to use as possible. Being a menu-driven program, it lets you scroll through the various submenus and select from the available options using the navigation keys.

- The BIOS setup screens shown in this section are for reference purposes only, and may not exactly match what you see on your screen.
- If the system becomes unstable after changing any BIOS setting, load the default settings to ensure system compatibility and stability. Select the **Load Setup Defaults** item under the **Exit** menu. See section **3.10 Exit Menu** for details.
- If the system fails to boot after changing any BIOS setting, try to clear the CMOS and reset the motherboard to the default value. **See section 2.6 Jumper** for details.

3.3.1 BIOS menu screen



3.3.2 Menu bar

The menu bar on top of the screen has the following main items:

Main	For changing the basic system configuration
Ai Tweaker	For changing the overclocking settings
Advanced	For changing the advanced system settings
Power	For changing the advanced power management (APM) configuration
Boot	For changing the system boot configuration
Tools	For configuring options for special functions
Exit	For selecting the exit options and loading default settings

3.3.3 Navigation keys

At the bottom right corner of a menu screen are the navigation keys for that particular menu. Use the navigation keys to select items in the menu and change the settings.

The navigation keys may differ from one screen to another.

3.3.4 Menu items

The highlighted item on the menu bar displays the specific items for that menu. For example, selecting **Main** shows the Main menu items.

The other items (Ai Tweaker, Advanced, Power, Boot, Tools, and Exit) on the menu bar have their respective menu items.

3.3.5 Submenu items

A solid triangle before each item on any menu screen means that the item has a submenu. To display the submenu, select the item and press <Enter>.

3.3.6 Configuration fields

These fields show the values for the menu items. If an item is user-configurable, you can change the value of the field opposite the item. You cannot select an item that is not user-configurable.

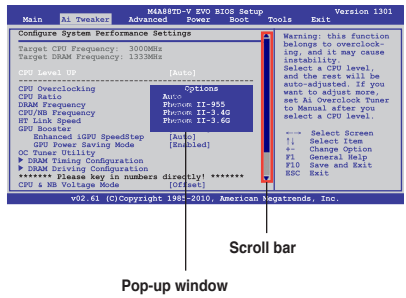
A configurable field is enclosed in brackets, and is highlighted when selected. To change the value of a field, select it and press <Enter> to display a list of options. Refer to **3.3.7 Pop-up window.**

3.3.7 Pop-up window

Select a menu item and press <Enter> to display a pop-up window with the configuration options for that item.

3.3.8 Scroll bar

A scroll bar appears on the right side of a menu screen when there are items that do not fit on the screen. Press the Up/Down arrow keys or <Page Up> / <Page Down> keys to display the other items on the screen.



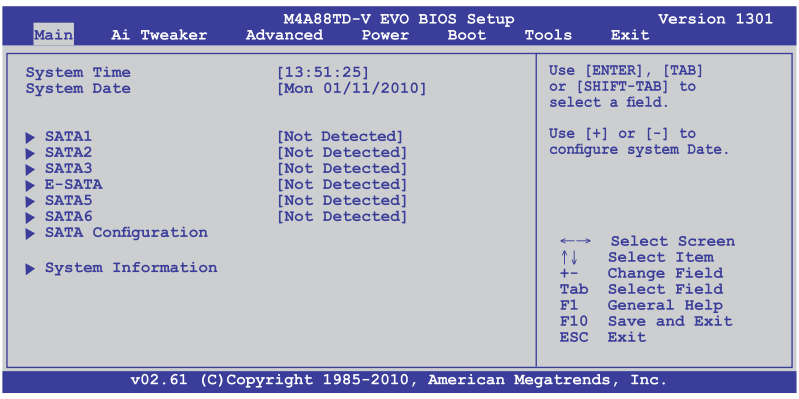
3.3.9 General help

At the top right corner of the menu screen is a brief description of the selected item.

3.4 Main menu

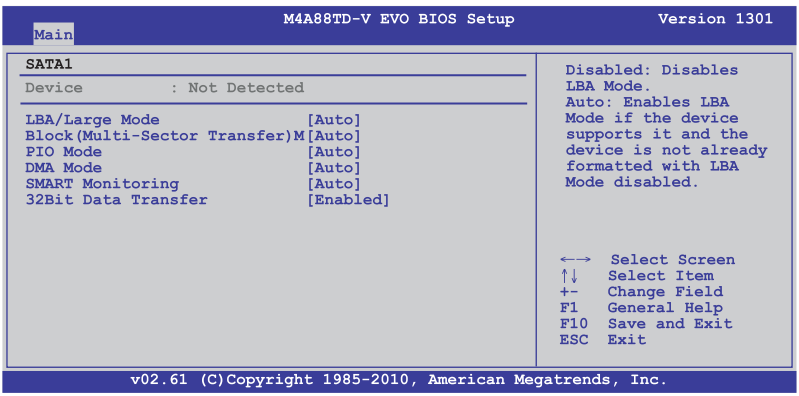
When you enter the BIOS Setup program, the Main menu screen appears, giving you an overview of the basic system information. Select an item and press <Enter> to display the submenu.

Refer to **section 3.3.1 BIOS menu screen** for information on the menu screen items and how to navigate through them.



3.4.1 SATA 1/2/3/5/6, E-SATA

While entering Setup, the BIOS automatically detects the presence of SATA devices. There is a separate submenu for each SATA device. Select a device item and press <Enter> to display the SATA device information.


M4A88TD-V EVO BIOS Setup
Version 1301
Main
SATA1
Device : Not Detected
LBA/Large Mode [Auto]
Block(Multi-Sector Transfer)M [Auto]
PIO Mode [Auto]
DMA Mode [Auto]
SMART Monitoring [Auto]
32Bit Data Transfer [Enabled]
Disabled: Disables LBA Mode.
Auto: Enables LBA Mode if the device supports it and the device is not already formatted with LBA Mode disabled.
←→ Select Screen
↑↓ Select Item
+- Change Field
F1 General Help
F10 Save and Exit
ESC Exit
v02.61 (C)Copyright 1985-2010, American Megatrends, Inc.

The BIOS automatically detects the values opposite the dimmed items (Device, Vendor, Size, LBA Mode, Block Mode, PIO Mode, Async DMA, Ultra DMA, and SMART Monitoring). These values are not user-configurable. These items show **N/A** if no SATA device is installed in the system.

Type [Auto]

Allows you to select the type of device installed.

[Not Installed]	Select this option if no device is installed.
[Auto]	Allows automatic selection of the appropriate device type.
[CDROM]	Select this option if you are specifically configuring a CD-ROM drive.
[ARMD]	Select [ARMD] (ATAPI Removable Media Device) if your device is either a ZIP, LS-120, or MO drive.

This item appears in **SATA 5/SATA 6** only.

LBA/Large Mode [Auto]

[Auto]	Select [Auto] to enable the LBA mode (Logical Block Addressing mode) if the device supports this mode, and if the device was not previously formatted with LBA mode disabled.
[Disabled]	Disables this function.

Block (Multi-Sector Transfer) M [Auto]

[Auto]	When set to [Auto], the data transfer from and to the device occurs in multiple sectors at a time if the device supports multi-sector transfer feature.
[Disabled]	When set to [Disabled], the data transfer from and to the device occurs one sector at a time.

PIO Mode [Auto]

[Auto]	Allows automatic selection of the PIO (Programmed input/output) modes, which correspond to different data transfer rates.
[0] [1] [2] [3] [4]	Sets the PIO mode to Mode 0, 1, 2, 3, or 4.

DMA Mode [Auto]

DMA (Direct Memory Access) allows your computer to transfer data to and from the hardware devices installed with much less CPU overhead.

The DMA mode consists of SDMA (single-word DMA), MDMA (multi-word DMA), and UDMA (Ultra DMA). Setting to [Auto] allows automatic selection of the DMA mode.

SMART Monitoring [Auto]

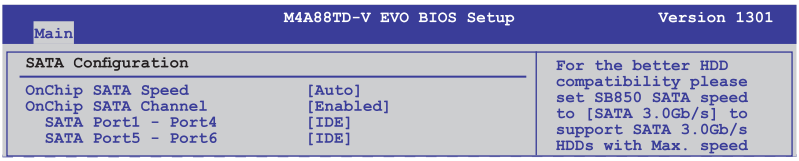
[Auto]	Allows automatic selection of the S.M.A.R.T (Smart Monitoring, Analysis, and Reporting Technology).
[Enabled]	Enables the S.M.A.R.T feature.
[Disabled]	Disables the S.M.A.R.T feature.

32Bit Data Transfer [Enabled]

[Enabled]	Sets the controller to combine two 16-bit reads from the hard disk into a single 32-bit double word transfer to the processor. This makes more efficient use of the PCI bus as fewer transactions are needed for the transfer of a particular amount of data.
[Disabled]	Disables this function.

3.4.2 SATA Configuration

The SATA Configuration menu allows you to configure your storage devices. Select an item then press <Enter> to display the submenu.


M4A88TD-V EVO BIOS Setup
Version 1301
Main
SATA Configuration
OnChip SATA Speed [Auto]
OnChip SATA Channel [Enabled]
SATA Port1 - Port4 [IDE]
SATA Port5 - Port6 [IDE]
For the better HDD compatibility please set SB850 SATA speed to [SATA 3.0Gb/s] to support SATA 3.0Gb/s HDDs with Max. speed

OnChip SATA Speed [Auto]

[Auto] Allows automatic detection of the SATA speed.

[SATA 3.0Gb/s] Set this item to [SATA 3.0Gb/s] if you installed 3.0Gb/s SATA HDDs on this motherboard.

[SATA 6.0Gb/s] Set this item to [SATA 6.0Gb/s] if you installed 6.0Gb/s SATA HDDs on this motherboard.

OnChip SATA Channel [Enabled]

[Enabled] Enables the onboard channel SATA port.

[Disabled] Disables the onboard channel SATA port.

The following two items appear only when you set the **OnChip SATA Channel** item to [Enabled].

SATA Port1 - Port4 [IDE]

Allows you to set the SATA configuration.

[IDE] Set to [IDE] when you want to use the Serial ATA hard disk drives as Parallel ATA physical storage devices.

[RAID] Set to [RAID] when you want to create a RAID configuration from the SATA hard disk drives.

[AHCI] Set to [AHCI] when you want the SATA hard disk drives to use the AHCI (Advanced Host Controller Interface). The AHCI allows the onboard storage driver to enable advanced Serial ATA features that increases storage performance on random workloads by allowing the drive to internally optimize the order of commands.

- When this item is set to [AHCI], the information of the SATA connectors 1–6 can be seen under the OS environment or during POST.
- For Windows® XP OS, you have to install the AHCI driver, so that you could use the SATA connectors 1–6 in AHCI mode under the OS environment.

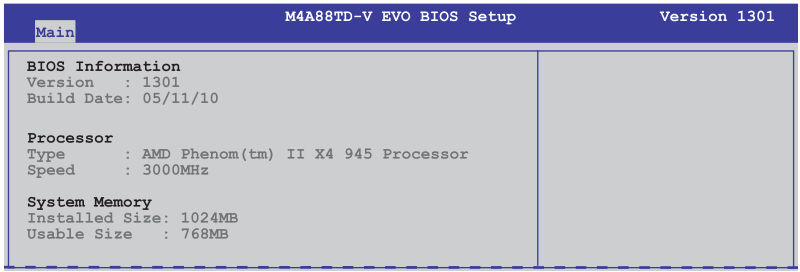
SATA Port5 - Port6 [IDE]

Setting this item to [IDE] instead of [RAID] or [AHCI] allows the system to recognize the optical dirves connected to the SATA connectors 5 or 6 when installing OS.

If you use a SATA optical drive to run the OS installation disk, we strongly recommend that you install the optical dirve to the SATA connectors 5/6 and set them to [IDE] mode.

3.4.3 System Information

This menu gives you an overview of the general system specifications. The BIOS automatically detects the BIOS information, CPU specification, and system memory in this menu.

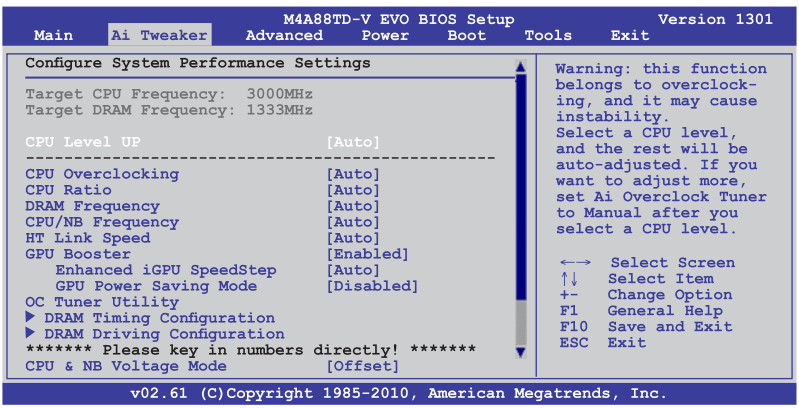


3.5 Ai Tweaker menu

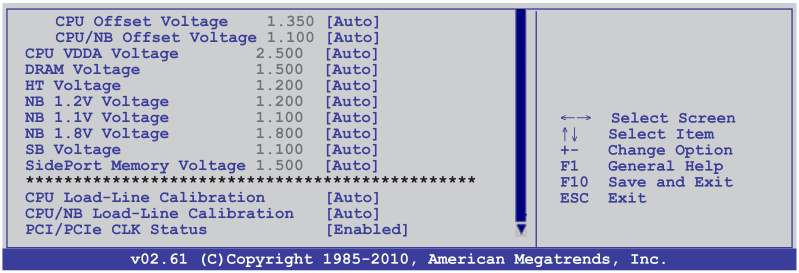
The Ai Tweaker menu items allow you to configure overclocking-related items.

Be cautious when changing the settings of the Ai Tweaker menu items. Incorrect field values can cause the system to malfunction.

The configuration options for this chapter vary depending on the CPU and DIMM model you installed on the motherboard.


M4A88TD-V EVO BIOS Setup
Version 1301
Main
Ai Tweaker
Advanced
Power
Boot
Tools
Exit
Configure System Performance Settings
Target CPU Frequency: 3000MHz
Target DRAM Frequency: 1333MHz
CPU Level UP [Auto]
CPU Overclocking [Auto]
CPU Ratio [Auto]
DRAM Frequency [Auto]
CPU/NB Frequency [Auto]
HT Link Speed [Auto]
GPU Booster [Enabled]
Enhanced iGPU SpeedStep [Auto]
GPU Power Saving Mode [Disabled]
OC Tuner Utility
DRAM Timing Configuration
DRAM Driving Configuration
******* Please key in numbers directly! *******
CPU & NB Voltage Mode [Offset]
Warning: this function belongs to overclocking, and it may cause instability.
Select a CPU level, and the rest will be auto-adjusted. If you want to adjust more, set Ai Overclock Tuner to Manual after you select a CPU level.
←→ Select Screen
↑↓ Select Item
+- Change Option
F1 General Help
F10 Save and Exit
ESC Exit
v02.61 (C)Copyright 1985-2010, American Megatrends, Inc.

Scroll down to display the following items:


CPU Offset Voltage 1.350 [Auto]
CPU/NB Offset Voltage 1.100 [Auto]
CPU VDDA Voltage 2.500 [Auto]
DRAM Voltage 1.500 [Auto]
HT Voltage 1.200 [Auto]
NB 1.2V Voltage 1.200 [Auto]
NB 1.1V Voltage 1.100 [Auto]
NB 1.8V Voltage 1.800 [Auto]
SB Voltage 1.100 [Auto]
SidePort Memory Voltage 1.500 [Auto]
****
CPU Load-Line Calibration [Auto]
CPU/NB Load-Line Calibration [Auto]
PCI/PCIe CLK Status [Enabled]
←→ Select Screen
↑↓ Select Item
+- Change Option
F1 General Help
F10 Save and Exit
ESC Exit
v02.61 (C)Copyright 1985-2010, American Megatrends, Inc.

3.5.1 CPU Level UP [Auto]

Allows you to select a CPU level, and the related parameters will be automatically adjusted according to the selected CPU level. If you want to manually configure the settings in detail, set **CPU Overclocking** to [Manual] after selecting a CPU level.
Configuration options: [Auto] [Phenom II-955] [Phenom II-3.4G] [Phenom II-3.6G]

- The configuration options vary depending on the CPU model you install on the motherboard.
- The CPU Level UP function support depends on CPU types.

3.5.2 CPU OverClocking [Auto]

Allows you to select the CPU overclocking options to achieve the desired CPU internal frequency. Select any of these preset overclocking configuration options:

Manual	Allows you to individually set overclocking parameters.
Auto	Loads the optimal settings for the system.
D.O.C.P	Allows you to select a DRAM O.C. profile, and the related parameters will be adjusted automatically.
CPU Level UP	Allows you to select a CPU level, and the related parameters will be adjusted automatically.
Overclock Profile	Allows you to select an overclocking profile.

The configuration options for the following sub-items vary depending on the CPU/DIMMs you install on the motherboard.

OC From CPU Level UP [Auto]

This item appears only when you set the **CPU OverClocking** item to [Manual] and allows you to select a CPU level. The related parameters will be automatically adjusted according to the selected CPU level.

CPU/HT Reference Clcok (MHz) [XXX]

This item appears only when you set the **CPU OverClocking** item to [Manual] or [D.O.C.P] and displays the frequency sent by the clock generator to the system bus and PCI bus. Use the <+> and <-> keys to adjust the CPU Bus frequency. You can also key in the desired frequency using the numeric keypad. The values range from 100 to 550.

PCIE Frequency [XXX]

This item appears only when you set the **CPU OverClocking** item to [Manual] and allows you to set the PCI Express frequency. Use the <+> and <-> keys to adjust the PCIE frequency. You can also key in the desired value using the numeric keypad. The values range from 100 to 150.

DRAM O.C. Profile [DDR3-1600MHz]

This item appears only when you set the **CPU OverClocking** item to [D.O.C.P.] and allows you to select a DRAM O.C. profile, which applies different settings to DRAM frequency, DRAM timing and DRAM voltage. Configuration options: [DDR3-1600MHz] [DDR3-1800MHz] [DDR3-1866MHz] [DDR3-2000MHz]

Profile Info : xxxxMHz–x-x-x-xx

This item appears only when you set the **CPU OverClocking** item to [D.O.C.P.] and displays the current DRAM profile information. The profile information varies according to the **DRAM O.C. Profile** you've selected.

Overclock Options [Auto]

This item appears only when you set the **CPU OverClocking** item to [Overclock Profile] and allows you to select an overclocking profile. Configuration options: [Auto] [Overclock 2%] [Overclock 5%] [Overclock 8%] [Overclock 10%]

3.5.3 CPU Ratio [Auto]

Allows you to set the ratio between the CPU Core Clock and the FSB Frequency. Use the <+> and <-> keys to adjust the ratio. The valid value ranges vary according to your CPU model.

The following two items appear only when you installed a 6-core CPU on this motherboard.

AMD Turbo CORE technology [Enabled]

Enables or disables the AMD Turbo Core technology. Configuration options: [Disabled] [Enabled]

Turbo CORE Ratio [Auto]

Set the Turbo Core ratio. Use the <+> / <-> keys to adjust the ratio. The valid value ranges vary depending on your CPU model. Configuration options: [Auto]

3.5.4 DRAM Frequency [Auto]

Allows you to set the DDR3 operating frequency. The configuration options vary with the **CPU Bus Frequency** item settings.

Selecting a very high DRAM frequency may cause the system to become unstable! If this happens, revert to the default setting.

3.5.5 CPU/NB Frequency [Auto]

Allows you to select the CPU/NB frequency.
Configuration options: [1400MHz] [1600MHz] [1800MHz] [2000MHz]

3.5.6 HT Link Speed [Auto]

Allows you to select the HyperTransport link speed.
Configuration options: [Auto] [200MHz] [400MHz] [600MHz] [800MHz] [1000MHz] [1200MHz] [1400MHz] [1600MHz] [1800MHz] [2000MHz]

3.5.7 GPU Booster [Enabled]

[Enabled] Enables auto-optimization of the iGPU frequency.

[Disabled] Set this item to [Disabled] for a fixed iGPU frequency.

Enhanced iGPU SpeedStep [Auto]

This item appears only when you set the **GPU Booster** item to [Enabled] and allows you to select an auto-optimization profile for the iGPU frequency.
Configuration options: [Auto] [Turbo] [Extreme] [Manual]

GPU Power Saving Mode [Disabled]

This item appears only when you set the **GPU Booster** item to [Enabled] and allows you to enable or disable the GPU Power Saving Mode.
Configuration options: [Enabled] [Disabled]

GPU Engine Clock [700]

This item appears when you set the **GPU Booster** item to [Disabled] or the **Enhanced iGPU SpeedStep** item to [Manual] and allows you to set the GPU Engine Clock. Use the <+> and <-> keys to adjust the value. You can also key in the desired value using the numeric keypad. The value ranges from 200 to 2000.

3.5.8 OC Tuner Utility

OC Tuner utility automatically overclocks the frequency and voltage of the CPU and DRAM. Press <Enter> to start auto tuning. It takes around five minutes, and the system will reboot for several times until auto tuning is completed.

3.5.9 DRAM Timing Configuration

The configuration options for some of the following items vary depending on the DIMMs you install on the motherboard.

DRAM CAS# Latency [Auto]

Configuration options: [Auto] [4 CLK] – [12 CLK]

DRAM RAS# to CAS# Delay [Auto]

Configuration options: [Auto] [5 CLK] – [12 CLK]

DRAM RAS# PRE Time [Auto]

Configuration options: [Auto] [5 CLK] – [12 CLK]

DRAM RAS# ACT Time [Auto]

Configuration options: [Auto] [15 CLK] – [30 CLK]

DRAM READ to PRE Time [Auto]

Configuration options: [Auto] [4 CLK] [5 CLK] [6 CLK] [7 CLK]

DRAM Row Cycle Time [Auto]

Configuration options: [Auto] [11 CLK] – [41 CLK]

DRAM WRITE Recovery Time [Auto]

Configuration options: [Auto] [5 CLK] [6 CLK] [7 CLK] [8 CLK] [10 CLK] [12 CLK]

DRAM RAS# to RAS# Delay [Auto]

Configuration options: [Auto] [4 CLK] [5 CLK] [6 CLK] [7 CLK]

DRAM READ to WRITE Delay [Auto]

Configuration options: [Auto] [3 CLK] – [17 CLK]

DRAM WRITE to READ Delay(DD) [Auto]

Configuration options: [Auto] [2 CLK] – [10 CLK]

DRAM WRITE to READ Delay(SD) [Auto]

Configuration options: [Auto] [4 CLK] [5 CLK] [6 CLK] [7 CLK]

DRAM WRITE to WRITE Timing [Auto]

Configuration options: [Auto] [3 CLK] – [10 CLK]

DRAM READ to READ Timing [Auto]

Configuration options: [Auto] [3 CLK] – [10 CLK]

DRAM REF Cycle Time [Auto]

Configuration options: [Auto] [90ns] [110ns] [160ns] [300ns] [350ns]

DRAM Refresh Rate [Auto]

Configuration options: [Auto] [Every 7.8ms] [Every 3.9ms]

DRAM Command Rate [Auto]

Configuration options: [Auto] [1T] [2T]

3.5.10 DRAM Driving Configuration

The configuration options for some of the following items vary depending on the DIMMs you install on the motherboard.

CKE drive strength [Auto]

Configuration options: [Auto] [1x] [1.25x] [1.5x] [2x]

CS/ODT drive strength [Auto]

Configuration options: [Auto] [1x] [1.25x] [1.5x] [2x]

ADDR/CMD drive strength [Auto]

Configuration options: [Auto] [1x] [1.25x] [1.5x] [2x]

MEMCLK drive strength [Auto]

Configuration options: [Auto] [0.75x] [1x] [1.25x] [1.5x]

Data drive strength [Auto]

Configuration options: [Auto] [0.75x] [1x] [1.25x] [1.5x]

DQS drive strength [Auto]

Configuration options: [Auto] [0.75x] [1x] [1.25x] [1.5x]

Processor ODT [Auto]

Configuration options: [Auto] [240 ohms +/- 20%] [120 ohms +/- 20%] [60 ohms +/- 20%]

Some of the following items are adjusted by typing the desired values using the numeric keypad and press the <Enter> key. You can also use the <+> and <-> keys to adjust the value. To restore the default setting, type [auto] using the keyboard and press the <Enter> key.

3.5.11 CPU & NB Voltage Mode [Offset]

Allows you to set the CPU & CPU/NB Voltage Mode. Different sub-items appear according to the **CPU & NB Voltage Mode** item setting. Configuration options: [Offset] [Manual]

CPU Offset Voltage [Auto]

This item appears only when you set the **CPU & NB Voltage Mode** item to [Offset] and allows you to set the CPU Offset voltage. The values range from 0.003125V to 0.500000V with a 0.003125V interval.

CPU/NB Offset Voltage [Auto]

This item appears only when you set the **CPU & NB Voltage Mode** item to [Offset] and allows you to set the CPU/NB Offset voltage. The values range from 0.003125V to 0.500000V with a 0.003125V interval.

CPU Voltage [Auto]

This item appears only when you set the **CPU & NB Voltage Mode** item to [Manual] and allows you to set a fixed CPU voltage.

CPU/NB Voltage [Auto]

This item appears only when you set the **CPU & NB Voltage Mode** item to [Manual] and allows you to set a fixed CPU/NB voltage.

3.5.12 CPU VDDA Voltage [Auto]

Allows you to set the CPU VDDA voltage. The values range from 2.50V to 2.80V with a 0.10V interval.

3.5.13 DRAM Voltage [Auto]

Allows you to set the DRAM voltage. The values range from 1.20000V to 2.44500V with a 0.01500V interval.

3.5.14 HT Voltage [Auto]

Allows you to set the HyperTransport voltage. The values range from 1.20000V to 1.40000V with a 0.01000V interval.

3.5.15 NB 1.2V Voltage [Auto]

Allows you to set the Northbridge 1.2V voltage. The values range from 1.20000V to 1.83000V with a 0.01000V interval.

3.5.16 NB 1.1V Voltage [Auto]

Allows you to set the Northbridge 1.1V voltage. The values range from 1.10V to 1.40V with a 0.01V interval.

3.5.17 NB 1.8V Voltage [Auto]

Allows you to set the Northbridge 1.8V voltage. The values range from 1.80V to 1.90V with a 0.10V interval.

3.5.18 SB Voltage [Auto]

Allows you to set the Southbridge voltage. The values range from 1.10V to 1.40V with a 0.10V interval.

3.5.19 SidePort Memory Voltage [Auto]

Allows you to set the SidePort memory voltage. The values range from 1.50V to 1.80V with a 0.10V interval.

- Setting the above voltages to a high level may damage the CPU, memory module, and chipset permanently. Proceed with caution.
- The system may require a better cooling system to work stably under high voltage settings.

3.5.20 CPU Load-Line Calibration [Auto]

Allows you to select the CPU Load-Line mode.
Configuration options: [Auto] [Disabled] [Enabled]

3.5.21 CPU/NB Load-Line Calibration [Auto]

Allows you to select the CPU/NB Load-Line mode.
Configuration options: [Auto] [Disabled] [Enabled]

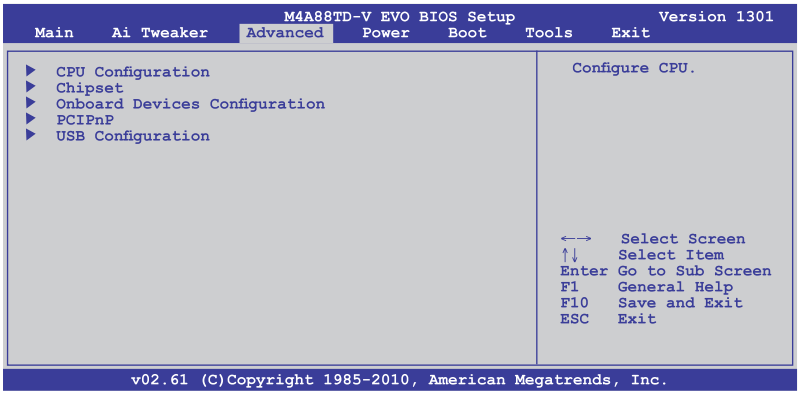
3.5.22 PCI/PCIe CLK Status [Enabled]

Allows you to enable and disable clock for PCI/PCIe slot.
Configuration options: [Disabled] [Enabled]

3.6 Advanced menu

The Advanced menu items allow you to change the settings for the CPU and other system devices.

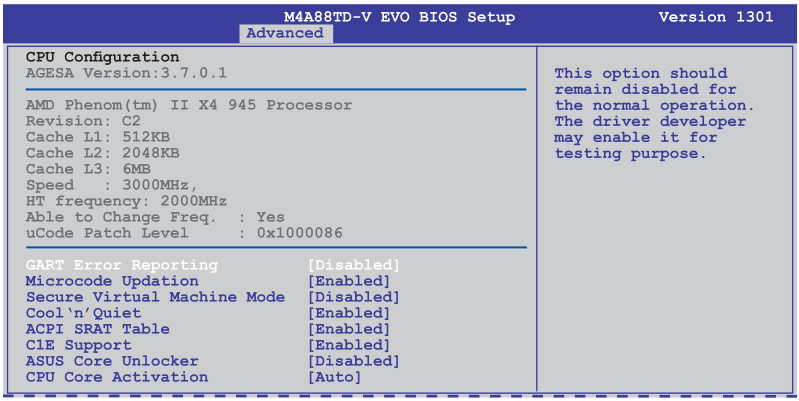
Be cautious when changing the settings of the Advanced menu items. Incorrect field values can cause the system to malfunction.



3.6.1 CPU Configuration

The items in this menu show the CPU-related information that the BIOS automatically detects.

The items shown in this screen may be different due to the CPU you installed.


M4A88TD-V EVO BIOS Setup
Version 1301
Advanced
CPU Configuration
AGESA Version:3.7.0.1
AMD Phenom(tm) II X4 945 Processor
Revision: C2
Cache L1: 512KB
Cache L2: 2048KB
Cache L3: 6MB
Speed : 3000MHz,
HT frequency: 2000MHz
Able to Change Freq. : Yes
uCode Patch Level : 0x1000086
GART Error Reporting [Disabled]
Microcode Updation [Enabled]
Secure Virtual Machine Mode [Disabled]
Cool'n'Quiet [Enabled]
ACPI SRAT Table [Enabled]
C1E Support [Enabled]
ASUS Core Unlocker [Disabled]
CPU Core Activation [Auto]
This option should remain disabled for the normal operation. The driver developer may enable it for testing purpose.

GART Error Reporting [Disabled]

[Disabled] Disables the GART Error Reporting function.

[Enabled] Enables the GART Error Reporting function.

Microcode Updation [Enabled]

[Enabled] Allows the system to update the Microcode automatically, enhancing system performance.

[Disabled] Disables this function.

Secure Virtual Machine Mode [Disabled]

[Enabled] Enables the AMD Secure Virtual Machine mode.

[Disabled] Disables this function.

Cool'n'Quiet [Enabled]

[Enabled] Enables the AMD Cool'n'Quiet function.

[Disabled] Disables this function.

ACPI SRAT Table [Enabled]

[Enabled] Enables the building of ACPI SRAT Table.

[Disabled] Disables the building of ACPI SRAT Table.

C1E Support [Enabled]

[Enabled] Enables the C1E support function. This item should be enabled in order to enable the Enhanced Halt Sate.

[Disabled] Disables this function.

ASUS Core Unlocker [Disabled]

[Enabled] Enables the ASUS Core Unlocker to get the full computing power of the processor.

[Disabled] Disables this function.

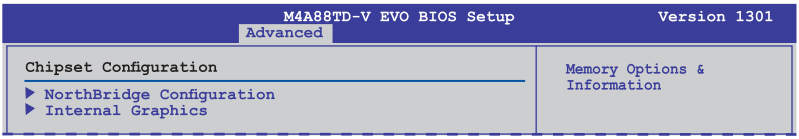
CPU Core Activation [Auto]

[Auto] Allows automatic activation of cores.

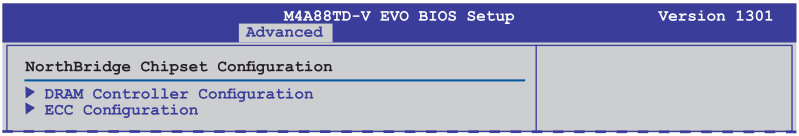
[Manual] Manually turn off a specific core.

3.6.2 Chipset

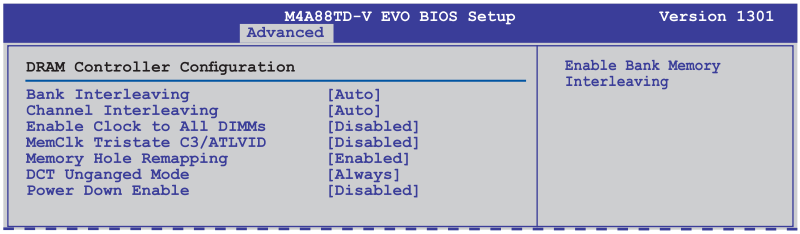
The Chipset menu allows you to change the advanced chipset settings. Select an item then press <Enter> to display the submenu.



NorthBridge Chipset Configuration



DRAM Controller Configuration



Bank Interleaving [Auto]

Allows you to enable the bank memory interleaving. Configuration options: [Auto] [Disabled]

Channel Interleaving [Auto]

Configuration options: [Disabled] [Address bits 6] [Address bits 12] [Auto] [XOR of Address bits [20:16, 6]] [XOR of Address bits [20:16, 9]

Enable Clock to All DIMMs [Disabled]

Enables unused Clocks to DIMMs even though memory slots are not populated. Configuraiton options: [Enabled] [Disabled]

MemClk Tristate C3/ATLVID [Disabled]

Configuration options: [Disabled] [Enabled]

Memory Hole Remapping [Enabled]

Configuration options: [Disabled] [Enabled]

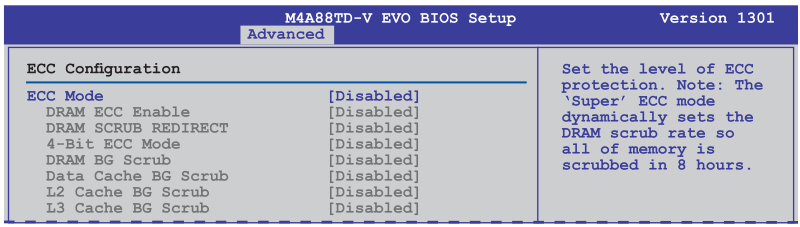
DCT Unganged Mode [Always]

Configuration options: [Auto] [Always]

Power Down Enable [Disabled]

Enables or disables the DDR power down mode.
Configuration options: [Disabled] [Enabled]

ECC Configuration

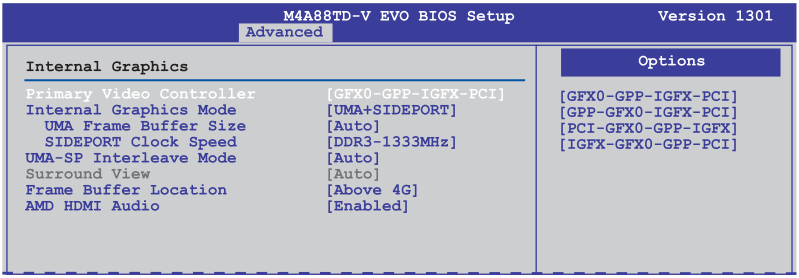

M4A88TD-V EVO BIOS Setup
Version 1301
Advanced
ECC Configuration
ECC Mode [Disabled]
DRAM ECC Enable [Disabled]
DRAM SCRUB REDIRECT [Disabled]
4-Bit ECC Mode [Disabled]
DRAM BG Scrub [Disabled]
Data Cache BG Scrub [Disabled]
L2 Cache BG Scrub [Disabled]
L3 Cache BG Scrub [Disabled]
Set the level of ECC protection. Note: The 'Super' ECC mode dynamically sets the DRAM scrub rate so all of memory is scrubbed in 8 hours.

ECC Mode [Disabled]

Disables or sets the DRAM ECC mode that allows the hardware to report and correct memory errors.

[Disabled]	Disables the DRAM ECC mode.
[Basic]	Set to [Basic] to adjust ECC mode automatically.
[Good]	Set to [Good] to adjust ECC mode automatically.
[Super]	Set to [Super] to adjust the **DRAM BG Scrub** sub-item manually.
[Max]	Set to [Max] to adjust ECC mode automatically.
[User]	Set to [User] to adjust all the subitems manually.

Internal Graphics Configuration



Primary Video Controller [GFX0-GPP-IGFX-PCI]

Configuration options: [GFX0-GPP-IGFX-PCI] [GPP-GFX0-IGFX-PCI] [PCI-GFX0-GPP-IGFX] [IGFX-GFX0-GPP-PCI]

Internal Graphics Mode [UMA+SidePort]

Selects the internal graphics mode. Configuration options: [Disabled] [UMA] [SidePort] [UMA+SidePort]

UMA Frame Buffer Size [Auto]

This item appears only when you set the Internal Graphics Mode item to [UMA] or [UMA+SIDEPORT]. Configuration options: [Auto] [32MB] [64MB] [128MB] [256MB] [512MB]

SidePort Clock Speed [DDR3-1333MHz]

This item appears only when you set the Internal Graphics Mode item to [SIDEPORT] or [UMA+SIDEPORT]. Configuration options: [DDR3-1333MHz] [DDR3-1400MHz] [DDR3-1430MHz] [DDR3-1460MHz] ~ [DDR3-2000MHz]

UMA-SP Interleave Mode [Auto]

This item appears only when you set the Internal Graphics Mode item to [UMA+SIDEPORT]. Configuration options: [Auto] [Coarse] [Fine]

Surround View [Auto]

If you set the PCI Express device as the primary display and enable this item, you may use the internal graphics as the secondary display. **This item appears only when you set the Internal Graphics Mode** item to [UMA], [SIDEPORT], or [UMA+SIDEPORT]. Configuration options: [Auto] [Enabled] [Disabled]

When set to [Auto], only the primary display could be activated.

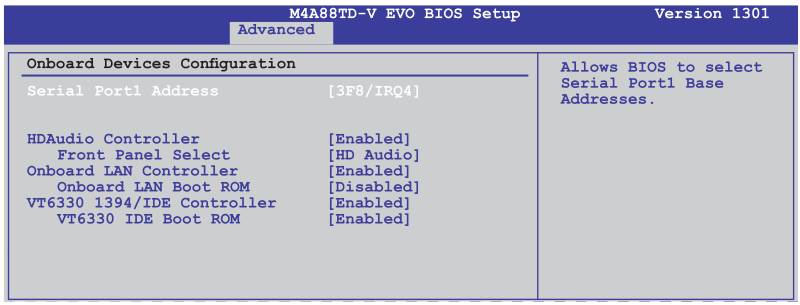
Frame Buffer Location [Above 4G]

Allows you to select the FB Location. Configuration options: [Below 4G] [Above 4G]

AMD HDMI Audio [Enabled]

Allows you to disable or enable the AMD 880 HD Audio.
Configuration options: [Disabled] [Enabled]

3.6.3 Onboard Devices Configuration


M4A88TD-V EVO BIOS Setup
Version 1301
Advanced
Onboard Devices Configuration
Serial Port1 Address [3F8/IRQ4]
HDAudio Controller [Enabled]
Front Panel Select [HD Audio]
Onboard LAN Controller [Enabled]
Onboard LAN Boot ROM [Disabled]
VT6330 1394/IDE Controller [Enabled]
VT6330 IDE Boot ROM [Enabled]
Allows BIOS to select Serial Port1 Base Addresses.

Serial Port1 Address [3F8/IRQ4]

Allows you to select the Serial Port1 base address.
Configuration options: [3F8/IRQ4] [2F8/IRQ3] [3E8/IRQ4] [2E8/IRQ3]

HDAudio Controller [Enabled]

Allows you to enable or disable the HD Audio controller.
Configuration options: [Disabled] [Enabled]

Front Panel Select [HD Audio]

Allows you to set the front panel audio connector (AAFP) mode to legacy AC'97 or high-definition audio depending on the audio standard that the front panel audio module supports.

[AC 97] Sets the front panel audio connector (AAFP) mode to legacy AC'97

[HD Audio] Sets the front panel audio connector (AAFP) mode to high definition audio.

Onboard LAN Controller [Enabled]

[Enabled] Enables the onboard LAN controller.

[Disabled] Disables the controller.

Onboard LAN Boot ROM [Disabled]

This item appears only when you set the previous item to [Enabled].

[Enabled] Enables the onboard Gigabit LAN Boot ROM.

[Disabled] Disables the LAN Boot ROM.

VT6330 1394/IDE Controller [Enabled]

[Enabled] Enables the onboard IEEE 1394a/IDE controller.

[Disabled] Disables the controller.

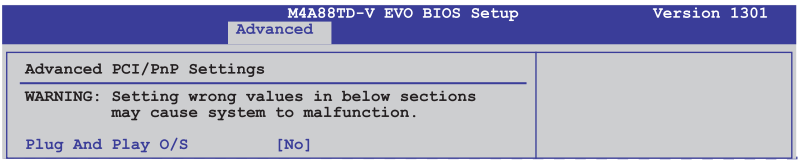
VT6330 IDE Boot ROM [Enabled]

[Enabled] Enables the VT6330 IDE Boot ROM.

[Disabled] Disables the VT6330 IDE Boot ROM.

3.6.4 PCIPnP

The PCI PnP menu items allow you to change the advanced settings for PCI/PnP devices.



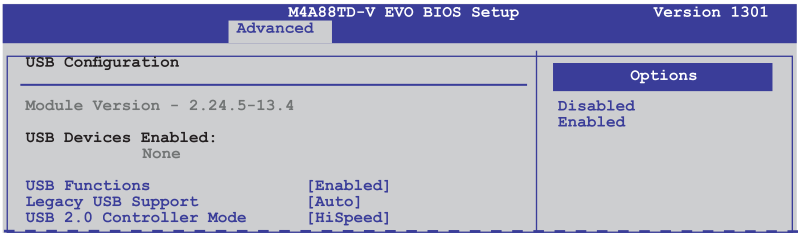
Plug And Play O/S [No]

[Yes] When set to [Yes] and if you install a Plug and Play operating system, the operating system configures the Plug and Play devices not required for boot.

[No] When set to [No], BIOS configures all the devices in the system.

3.6.5 USB Configuration

The items in this menu allow you to change the USB-related features. Select an item and press <Enter> to display the configuration options.



The **USB Devices Enabled** item shows the auto-detected values. If no USB device is detected, the item shows **None**.

USB Functions [Enabled]

[Enabled] Enables the USB Host Controllers.

[Disabled] Disables the controllers.

The following items appear only when you set **USB Support** to [Enabled].

Legacy USB Support [Auto]

[Auto] Allows the system to detect the presence of USB devices at startup. If detected, the USB controller legacy mode is enabled. If no USB device is detected, the legacy USB support is disabled.

[Enabled] Enables the support for USB devices on legacy operating systems (OS).

[Disabled] Disables the function.

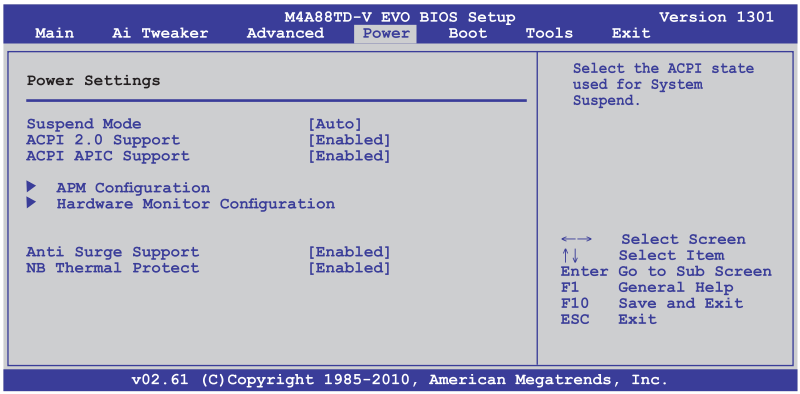
USB 2.0 Controller Mode [HiSpeed]

[FullSpeed] Sets the USB 2.0 controller mode to FullSpeed (12 Mbps).

[HiSpeed] Sets the USB 2.0 controller mode to HiSpeed (480 Mbps).

3.7 Power menu

The Power menu items allow you to change the settings for the Advanced Power Management (APM). Select an item then press <Enter> to display the configuration options.



3.7.1 Suspend Mode [Auto]

Allows you to select the Advanced Configuration and Power Interface (ACPI) state to be used for system suspend.

[Auto] The system automatically configures the ACPI suspend mode.

[S1 (POS) only] Sets the ACPI suspend mode to S1/POS (Power On Suspend).

[S3 only] Sets the ACPI suspend mode to S3/STR (Suspend To RAM).

3.7.2 ACPI 2.0 Support [Enabled]

[Disabled] The system will not add additional tables as per ACPI 2.0 specifications.

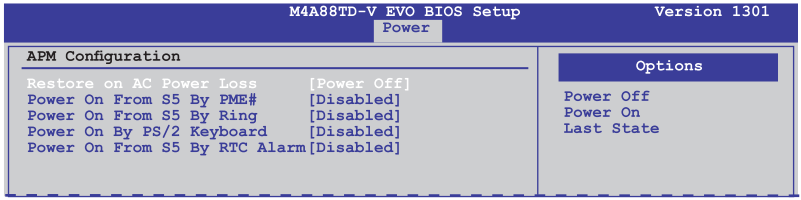
[Enabled] The system adds additional tables as per ACPI 2.0 specifications.

3.7.3 ACPI APIC Support [Enabled]

[Disabled] The system disables the Advanced Configuration and Power Interface (ACPI) support in the Advanced Programmable Interrupt Controller (APIC).

[Enabled] The ACPI APIC table pointer is included in the RSDT pointer list.

3.7.4 APM Configuration



Restore On AC Power Loss [Power Off]

[Power On] The system goes into on state after an AC power loss.

[Power Off] The system goes into off state after an AC power loss.

[Last State] The system goes into either off or on state, whatever the system state was before the AC power loss.

Power On From S5 By PME# [Disabled]

[Disabled] Disables the PME to wake up from S5 by PCI/PCIE devices.

[Enabled] Allows you to turn on the system through a PCI/PCIE LAN or modem card. This feature requires an ATX power supply that provides at least 1A on the +5VSB lead.

Power On From S5 By Ring [Disabled]

[Disabled] Disables to power up the computer when the external modem receives a call while the computer is in Soft-off mode.

[Enabled] The computer could be powered up when the external modem receives a call while the computer is in Soft-off mode.

The computer cannot receive or transmit data until the computer and applications are fully running. Thus, connection cannot be made on the first try. Turning an external modem off and then back on while the computer is off causes an initialization string that turns the system power on.

Power On By PS/2 Keyboard [Disabled]

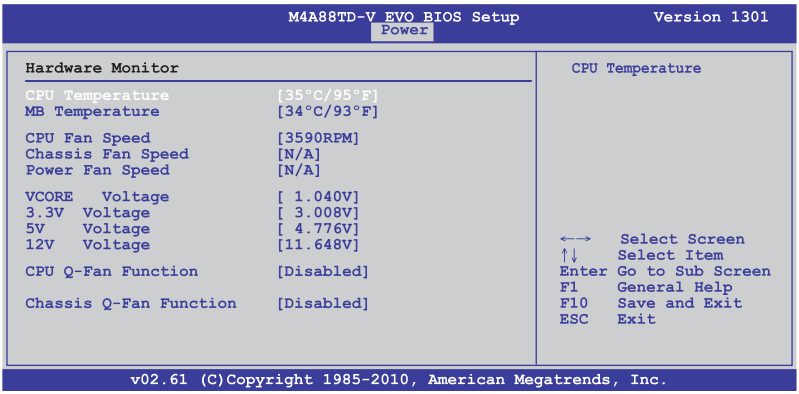
Enables or disables PS/2 keyboard to generate a wake event. This feature requires an ATX power supply that provides at least 1A on the +5VSB lead. Configuration options: [Disabled] [Space Bar] [Power Key] [Ctrl-Esc]

Power On From S5 By RTC Alarm [Disabled]

[Disabled] Disables RTC to generate a wake event.

[Enabled] When set to [Enabled], the items **RTC Alarm Date (Days)** and **System Time** will become user-configurable with set values.

3.7.5 Hardware Monitor



CPU Temperature(PECI) / MB Temperature [xxxºC/xxxºF]

The onboard hardware monitor automatically detects and displays the CPU and motherboard temperatures. Select **Ignored** if you do not wish to display the detected temperatures.

CPU Fan Speed [xxxxRPM] or [Ignored] / [N/A]
Chassis Fan Speed [xxxxRPM] or [Ignored] / [N/A]
Power Fan Speed [xxxxRPM] or [Ignored] / [N/A]

The onboard hardware monitor automatically detects and displays the CPU, chassis, and power fan speed in rotations per minute (RPM). If the fan is not connected to the motherboard, the field shows **N/A**. Select **Ignored** if you do not wish to display the detected speed.

VCORE Voltage, 3.3V Voltage, 5V Voltage, 12V Voltage

The onboard hardware monitor automatically detects the voltage output through the onboard voltage regulators. Select **Ignored** if you do not want to detect this item.

CPU Q-Fan Function [Disabled]

[Disabled] Disables the CPU Q-Fan feature.

[Enabled] Enables the CPU Q-Fan feature.

The following two items appear only when you set **CPU Q-Fan Function** to [Enabled].

CPU Fan Speed Low Limit [200 RPM]

Allows you to manually set a lower limit for the CPU fan speed. If the CPU fan speed is below the specified limit, the system sends out warning beeps. Configuration options: [500 RPM] [400 RPM] [300 RPM] [200 RPM] [100 RPM] [Ignored]

CPU Q-Fan Mode [Standard]

[Turbo] Sets to [Turbo] to achieve maximum CPU fan speed.

[Standard] Sets to [Standard] to make the CPU fan automatically adjust depending on the CPU temperature.

[Silent] Sets to [Silent] to minimize the fan speed for quiet CPU fan operation.

[Manual] Sets to [Manual] to assign detailed fan speed control parameters.

Chassis Q-Fan Function [Disabled]

[Disabled] Disables the Chassis Q-Fan feature.

[Enabled] Enables the Chassis Q-Fan feature.

The following two items appear only when you set **Chassis Q-Fan Function** to [Enabled].

Chassis Fan Speed Low Limit [200 RPM]

Allows you to manually set a lower limit for the Chassis fan speed. If the Chassis fan speed is below the specified limit, the system sends out warning beeps.

Configuration options: [500 RPM] [400 RPM] [300 RPM] [200 RPM] [100 RPM] [Ignored]

Chassis Q-Fan Mode [Standard]

[Turbo] Sets to [Turbo] to achieve maximum chassis fan speed.

[Standard] Sets to [Standard] to make the chassis fan automatically adjust depending on the chassis temperature.

[Silent] Sets to [Silent] to minimize fan speed for quiet chassis fan operation.

[Manual] Sets to [Manual] to assign detailed fan speed control parameters.

3.7.6 Anti Surge Support [Enabled]

[Enabled] Enables the Anti Surge support.

[Disabled] Disables the Anti Surge support.

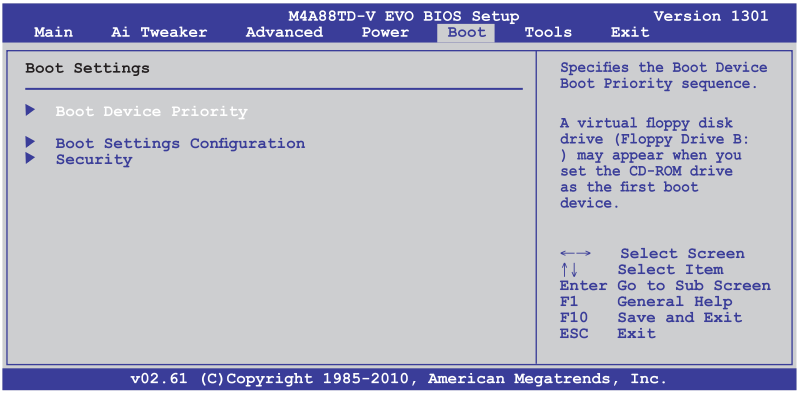
3.7.7 NB Thermal Protect

[Enabled] Enables NB Thermal Protection. Once the NB temperature exceeds 95ºC, the system will shut down automatically.

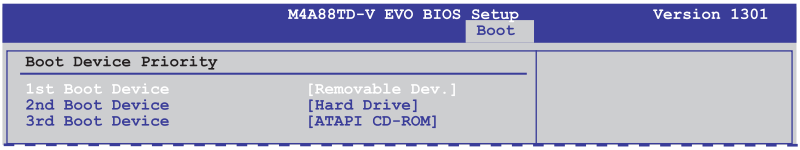
[Disabled] Disables NB Thermal Protection.

3.8 Boot menu

The Boot menu items allow you to change the system boot options. Select an item then press <Enter> to display the submenu.



3.8.1 Boot Device Priority



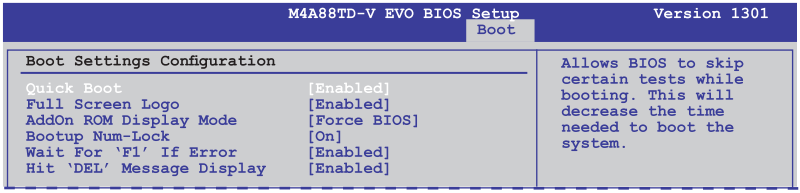
1st – xxth Boot Device [Removable Dev.]

These items specify the boot device priority sequence from the available devices. The number of device items that appears on the screen depends on the number of devices installed in the system. Configuration options: [Removable Dev.] [Hard Drive] [ATAPI CD-ROM] [Disabled]

- To select the boot device during system startup, press <F8> when ASUS Logo appears.
- To access Windows OS in Safe Mode, do any of the following:
  - Press <F5> when ASUS Logo appears.
  - Press <F8> after POST.

Chapter 3

3.8.2 Boot Settings Configuration


M4A88TD-V EVO BIOS Setup
Version 1301
Boot
Boot Settings Configuration
Quick Boot [Enabled]
Full Screen Logo [Enabled]
AddOn ROM Display Mode [Force BIOS]
Bootup Num-Lock [On]
Wait For 'F1' If Error [Enabled]
Hit 'DEL' Message Display [Enabled]
Allows BIOS to skip certain tests while booting. This will decrease the time needed to boot the system.

Quick Boot [Enabled]

[Disabled] When set to [Disabled], BIOS performs all the POST items.

[Enabled] When set to [Enabled], BIOS skips some power on self tests (POST) while booting to decrease the time needed to boot the system.

Full Screen Logo [Enabled]

[Enabled] Enables the full screen logo display feature.

[Disabled] Disables the full screen logo display feature.

Set this item to [Enabled] to use the ASUS MyLogo 2™ feature.

AddOn ROM Display Mode [Force BIOS]

[Force BIOS] The third-party ROM messages will be forced to display during the boot sequence.

[Keep Current] The third-party ROM messages will be displayed only if the third-party manufacturer had set the add-on device to do so.

Bootup Num-Lock [On]

[Off] Sets the power-on state of the NumLock to [Off].

[On] Sets the power-on state of the NumLock to [On].

Wait For 'F1' If Error [Enabled]

[Disabled] Disables this function.

[Enabled] The system waits for the <F1> key to be pressed when error occurs.

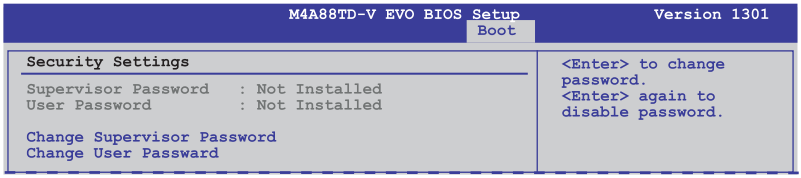
Hit 'DEL' Message Display [Enabled]

[Disabled] Disables this function.

[Enabled] The system displays the message "Press DEL to run Setup" during POST.

3.8.3 Security

The Security menu items allow you to change the system security settings. Select an item and press <Enter> to display the configuration options.



Change Supervisor Password

Select this item to set or change the supervisor password. The **Supervisor Password** item on top of the screen shows the default **Not Installed**. After you set a password, this item shows **Installed**.

To set a Supervisor Password:

1. Select the **Change Supervisor Password** item and press <Enter>.
2. From the password box, key in a password composed of up to six letters and/or numbers, then press <Enter>.
3. Confirm the password when prompted.

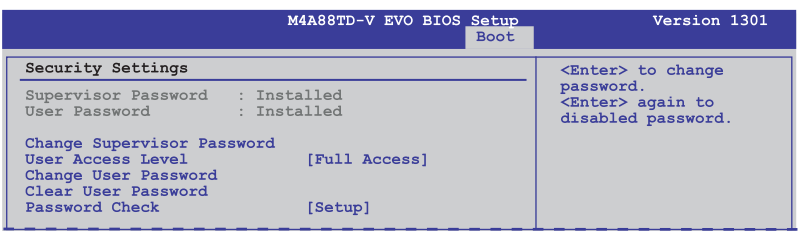
The message **Password Installed** appears after you successfully set your password.

To change the supervisor password, follow the same steps as in setting a user password.

To clear the supervisor password, select the **Change Supervisor Password** then press <Enter> twice. The message **Password Uninstalled** appears.

If you have forgotten your BIOS password, you can clear clear it by erasing the CMOS Real Time Clock (RTC) RAM. See section **2.6 Jumper** for information on how to erase the RTC RAM.

After you have set a supervisor password, the other items appear to allow you to change other security settings.



User Access Level [Full Access]

This item allows you to select the access restriction to the Setup items.

[No Access]	Prevents user access to the Setup utility.
[View Only]	Allows access but does not allow change to any field.
[Limited]	Allows changes only to selected fields, such as Date and Time.
[Full Access]	Allows viewing and changing all the fields in the Setup utility.

Change User Password

Select this item to set or change the user password. The **User Password** item on top of the screen shows the default **Not Installed**. After you set a password, this item shows Installed.

To set a User Password:

1. Select the **Change User Password** item and press <Enter>.
2. On the password box that appears, type a password composed of up to six letters and/or numbers, then press <Enter>.
3. Confirm the password when prompted.

The message **Password Installed** appears after you set your password successfully.

To change the user password, follow the same steps as in setting a user password.

Clear User Password

Select this item to clear the user password.

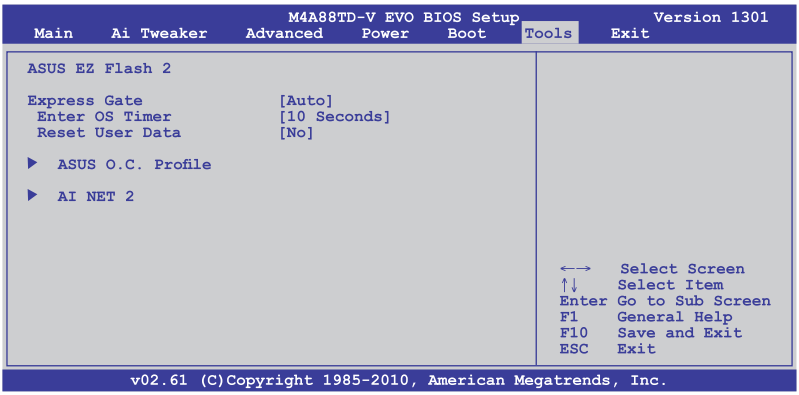
Password Check [Setup]

[Setup] BIOS checks for user password when accessing the Setup utility.

[Always] BIOS checks for user password both when accessing Setup and booting the system.

3.9 Tools menu

The Tools menu items allow you to configure options for special functions. Select an item then press <Enter> to display the submenu.



3.9.1 ASUS EZ Flash 2

Allows you to run ASUS EZ Flash 2. When you press <Enter>, a confirmation message appears. Use the left/right arrow key to select between [Yes] or [No], then press <Enter> to confirm your choice.

For more details, refer to section **3.2.2 ASUS EZ Flash 2 utility**.

3.9.2 Express Gate [Auto]

Allows you to enable or disable the ASUS Express Gate feature. The ASUS Express Gate feature is a unique instant-on environment that provides quick access to the Internet browser and Skype. Configuration options: [Enabled] [Disabled] [Auto]

Enter OS Timer [10 Seconds]

Sets countdown duration that the system waits at the Express Gate's first screen before starting Windows or other installed OS. Choose [Prompt User] to stay at the first screen of Express Gate for user action.
Configuration options: [Prompt User] [1 second] [3 seconds] [5 seconds] **[10 seconds]** [15 seconds] [20 seconds] [30 seconds]

Reset User Data [No]

Allows you to clear Express Gate's user data.

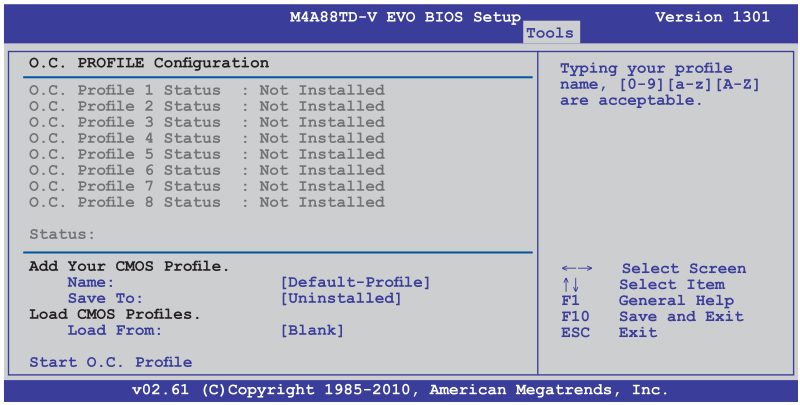
[Reset] When setting this item to [Reset], ensure that you save the setting to the BIOS so that the user data will be cleared the next time you enter the Express Gate. User data includes the Express Gate's settings as well as any personal information stored by the web browser such as bookmarks, cookies, browsing history. This is useful in the rare case where corrupt settings prevent the Express Gate environment from launching properly.

[No] Sets to [No] to disable the **Reset User Data** function when entering the Express Gate.

The first time wizard will run again when you enter the Express Gate environment after clearing its settings.

3.9.3 ASUS O.C. Profile

This item allows you to store or load multiple BIOS settings.


M4A88TD-V EVO BIOS Setup
Tools
Version 1301
O.C. PROFILE Configuration
O.C. Profile 1 Status : Not Installed
O.C. Profile 2 Status : Not Installed
O.C. Profile 3 Status : Not Installed
O.C. Profile 4 Status : Not Installed
O.C. Profile 5 Status : Not Installed
O.C. Profile 6 Status : Not Installed
O.C. Profile 7 Status : Not Installed
O.C. Profile 8 Status : Not Installed
Status:
Add Your CMOS Profile.
Name: [Default-Profile]
Save To: [Uninstalled]
Load CMOS Profiles.
Load From: [Blank]
Start O.C. Profile
Typing your profile name, [0-9][a-z][A-Z] are acceptable.
←→ Select Screen
↑↓ Select Item
F1 General Help
F10 Save and Exit
ESC Exit
v02.61 (C)Copyright 1985-2010, American Megatrends, Inc.

Add Your CMOS Profile

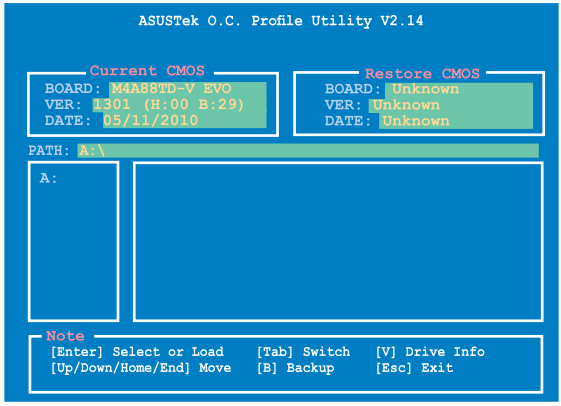
Allows you to save the current BIOS file to the BIOS Flash. In the Name sub-item, key in your profile name and press <Enter>, and then choose a profile number to save your CMOS settings in the **Save to** sub-item.

Load CMOS Profiles.

Allows you to load the previous BIOS settings saved in the BIOS Flash. Press <Enter> to load the file.

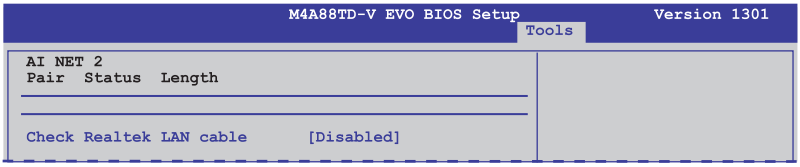
Start O.C. Profile

Allows you to run the utility to save and load CMOS. Press <Enter> to run the utility.



- This function can support devices such as a USB flash disk with FAT 32/16 format and single partition only.
- DO NOT shut down or reset the system while updating the BIOS to prevent the system boot failure!
- We recommend that you update the BIOS file only coming from the same memory/CPU configuration and BIOS version.
- Only the CMO file can be loaded.

3.9.4 AI NET 2



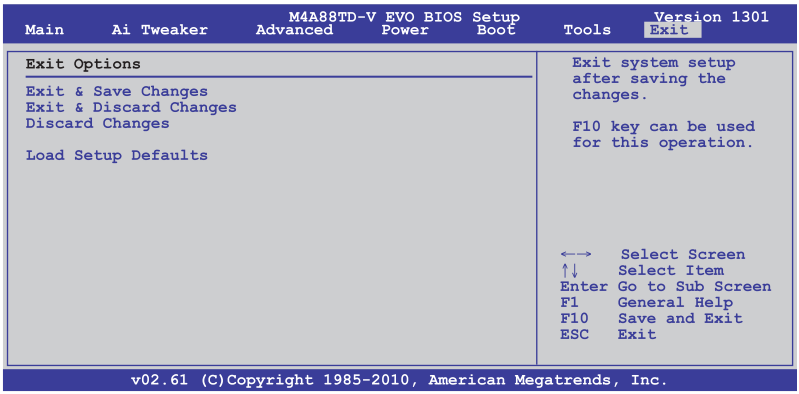
Check Realtek LAN cable [Disabled]

[Disabled] BIOS will not check the Realtek LAN cable during the Power-On Self-Test (POST).

[Enabled] BIOS checks the Realtek LAN cable during the Power-On Self-Test (POST).

3.10 Exit menu

The Exit menu items allow you to load the optimal or failsafe default values for the BIOS items, and save or discard your changes to the BIOS items.



Pressing <Esc> does not immediately exit this menu. Select one of the options from this menu or <F10> from the legend bar to exit.

Exit & Save Changes

Once you are finished making your selections, choose this option from the Exit menu to ensure the values you selected are saved to the CMOS RAM. An onboard backup battery sustains the CMOS RAM so it stays on even when the PC is turned off. When you select this option, a confirmation window appears. Select **Ok** to save changes and exit.

If you attempt to exit the Setup program without saving your changes, the program prompts you with a message asking if you want to save your changes before exiting. Press <Enter> to save the changes while exiting.

Exit & Discard Changes

Select this option only if you do not want to save the changes that you made to the Setup program. If you made changes to fields other than System Date, System Time, and Password, the BIOS asks for a confirmation before exiting.

Discard Changes

This option allows you to discard the selections you made and restore the previously saved values. After selecting this option, a confirmation appears. Select **Ok** to discard any changes and load the previously saved values.

Load Setup Defaults

This option allows you to load the default values for each of the parameters on the Setup menus. When you select this option or if you press <F5>, a confirmation window appears. Select **Ok** to load default values. Select **Exit & Save Changes** or make other changes before saving the values to the non-volatile RAM.

4.1 Installing an operating system

This motherboard supports Windows® XP/ 64-bit XP/ Vista / 64-bit Vista / 7 / 64-bit 7 operating systems (OS). Always install the latest OS version and corresponding updates to maximize the features of your hardware.

- Motherboard settings and hardware options vary. Use the setup procedures presented in this chapter for reference only. Refer to your OS documentation for detailed information.
- Ensure that you install the Windows® XP Service Pack 2 or later versions before installing the drivers for better compatibility and system stability.

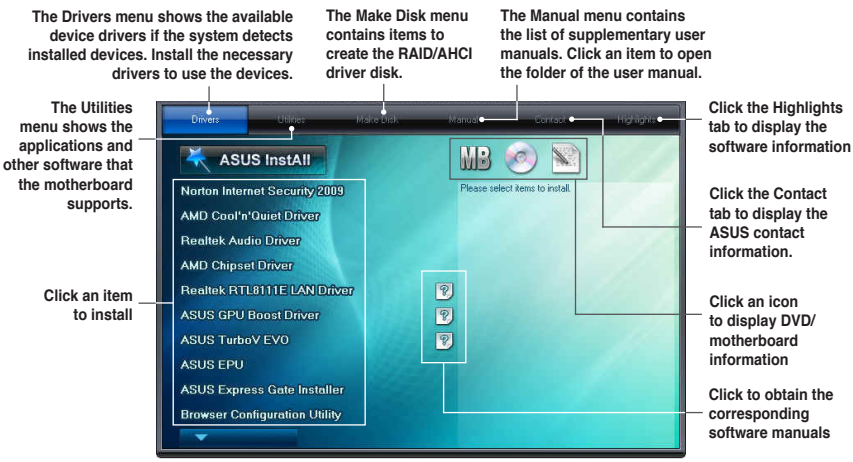
4.2 Support DVD information

The support DVD that comes with the motherboard package contains the drivers, software applications, and utilities that you can install to avail all motherboard features.

The contents of the support DVD are subject to change at any time without notice. Visit the ASUS website at www.asus.com for updates.

4.2.1 Running the support DVD

Place the support DVD into the optical drive. The DVD automatically displays the Highlights menu if Autorun is enabled in your computer. Click each menu tab and select the items you want to install.


The Drivers menu shows the available device drivers if the system detects installed devices. Install the necessary drivers to use the devices.
The Make Disk menu contains items to create the RAID/AHCI driver disk.
The Manual menu contains the list of supplementary user manuals. Click an item to open the folder of the user manual.
The Utilities menu shows the applications and other software that the motherboard supports.
Click the Highlights tab to display the software information
Click the Contact tab to display the ASUS contact information.
Click an item to install
Click an icon to display DVD/ motherboard information
Click to obtain the corresponding software manuals
Drivers
Utilities
Make Disk
Manual
Contact
Highlights
ASUS InstAll
Please select items to install.
Norton Internet Security 2009
AMD Cool'n'Quiet Driver
Realtek Audio Driver
AMD Chipset Driver
Realtek RTL8111E LAN Driver
ASUS GPU Boost Driver
ASUS TurboV EVO
ASUS EPU
ASUS Express Gate Installer
Browser Configuration Utility

If Autorun is NOT enabled in your computer, browse the contents of the support DVD to locate the file ASSETUP.EXE from the BIN folder. Double-click the ASSETUP.EXE to run the DVD.

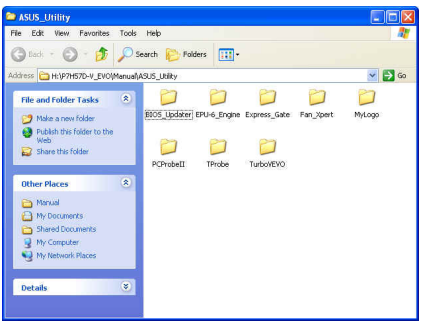
4.2.2 Obtaining the software manuals

The software manuals are included in the support DVD. Follow the instructions below to get the necessary software manuals.

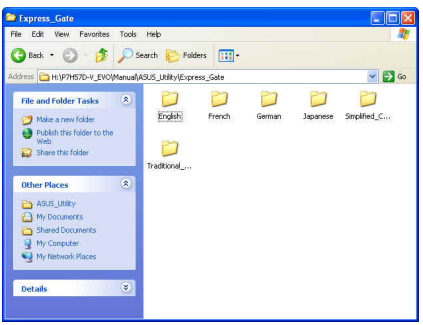
The software manual files are in Portable Document Format (PDF). Install the Adobe® Acrobat® Reader from the Utilities menu before opening the files.

1. Click the **Manual** tab. Click **ASUS Motherboard Utility Guide** from the manual list on the left.

2. The **Manual** folder of the support DVD appears. Double-click the folder of your selected software.



3. Some software manuals are provided in different languages. Double-click the language to show the software manual.



The screenshots in this section are for reference only. The actual software manuals containing in the support DVD vary by models.

4.3 Software information

Most of the applications in the support DVD have wizards that will conveniently guide you through the installation. View the online help or readme file that came with the software application for more information.

4.3.1 ASUS PC Probe II

PC Probe II is a utility that monitors the computer's vital components, and detects and alerts you of any problem with these components. PC Probe II senses fan rotations, CPU temperature, and system voltages, among others. Because PC Probe II is software-based, you can start monitoring your computer the moment you turn it on. With this utility, you are assured that your computer is always at a healthy operating condition.

Launching PC Probe II

1. Install PC Probe II from the motherboard support DVD.
2. Launch PC Probe II by clicking **Start > All Programs > ASUS > PC Probe II > PC Probe II v1.xx.xx**. The PC Probe II main window appears.
3. The PC Probe II icon appears in the Windows® notification area. Click this icon to close or restore the application.

PC Probe II main window

Button	Function
CONFIG	Opens the Configuration window
	Opens the Report window
DMI	Opens the Desktop Management Interface window
PCI	Opens the Peripheral Component Interconnect window
WMI	Opens the Windows Management Instrumentation window
USAGE	Opens the hard disk drive, memory, CPU usage window
	Shows/Hides the Preference section
	Minimizes the application
	Closes the application

Refer to the software manual in the support DVD or visit the ASUS website at www.asus.com for detailed software configuration.

4.3.2 ASUS AI Suite

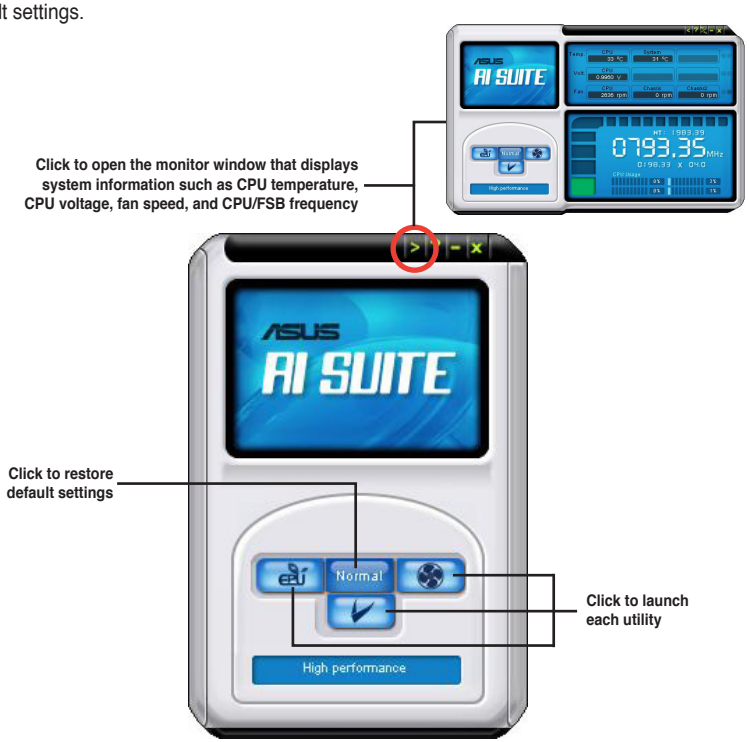
ASUS AI Suite allows you to launch several ASUS utilities easily.

Launching AI Suite

1. Install AI Suite from the motherboard support DVD.
2. Launch AI Suite by clicking **Start** > **All Programs** > **ASUS** > **AI Suite** > **AI Suite v1.xx.xx**. The AI Suite main window appears.
3. The AI Suite icon appears in the Windows® notification area. If you minimize the application main window, click this icon to restore the window.

Using AI Suite

Click each utility button to launch the utility, or click the **Normal** button to restore system default settings.


Click to open the monitor window that displays system information such as CPU temperature, CPU voltage, fan speed, and CPU/FSB frequency
Click to restore default settings
Click to launch each utility
ASUS
AI SUITE
Normal
High performance

- The screenshots in this section are for reference only. The actual utility buttons vary by models.
- Refer to the software manual in the support DVD or visit the ASUS website at www.asus.com for detailed software configuration.

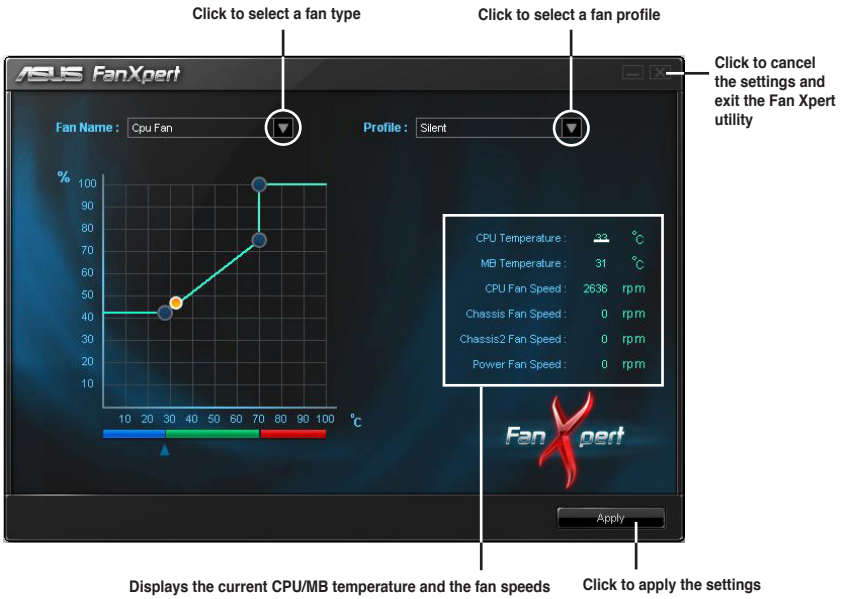
4.3.3 ASUS Fan Xpert

Asus Fan Xpert allows you to adjust both the CPU and chassis fan speeds according to different ambient temperatures and your PC's system loading. The various fan profiles offer flexible controls of fan speeds to achieve a quiet and cool system environment.

Launching Fan Xpert

After installing AI Suite from the motherboard support DVD, launch Fan Xpert by double-clicking the **AI Suite** tray icon and then clicking the **Fan Xpert** button on the AI Suite main window.

Using Fan Xpert



Fan profiles

- **Disable:** Select this mode to disable the **Fan Xpert** function.
- **Performance:** This mode boosts the fan to achieve maximal fan speed for the best cooling effect
- **Optimal:** This mode adjusts the CPU fan speed with the ambient temperature.
- **Silent:** This mode minimizes fan speed for quiet fan operation.
- **Manual:** This mode allows you to change the CPU fan profile under certain limitation.

4.3.4 ASUS EPU

ASUS EPU is an energy-efficient tool that provides you with a total system power-saving solution. It detects the current computer loading and intelligently adjusts the power in real-time. With auto phase switching for components, the EPU automatically provides the most appropriate power usage via intelligent acceleration and overclocking.

ASUS EPU provides you with these modes to choose from:

- **Auto Mode**
- **Max. Power Saving Mode**
- **High Performance Mode**

When you select A**uto Mode**, the system shifts modes automatically according to the current system status. You can also configure advanced settings for each mode.

Launching EPU

After installing EPU from the motherboard support DVD, double-click the EPU tray icon to launch the program.

EPU main menu

- EPU supports GPU power saving solution when you install the GPU Boost driver from the support DVD and set EPU to **Auto** or M**aximum Power Saving Mode**.
- Refer to the software manual in the support DVD or visit the ASUS website at www.asus.com for detailed software configuration.

Chapter 4

4.3.5 ASUS Express Gate

ASUS Express Gate is an ASUS exclusive OS that provides you with quick access to the Internet and key applications before entering the Windows® OS.

Notices about ASUS Express Gate

- Ensure to install ASUS Express Gate from the motherboard support DVD before use.
- ASUS Express Gate does not support SATA devices in RAID mode. See chapter 3 for BIOS setup details.
- Currently, ASUS Express Gate does not support SATA 6Gb/s devices. Please visit http://support.asus.com for future Express Gate updates.
- ASUS Express Gate supports file uploading from ODD and USB drives and downloading to USB drives only.
- ASUS Express Gate supports installation on SATA HDDs, USB HDDs and Flash drives with at least 1.2GB of available disk space. When installed on USB HDDs or Flash drives, **connect the drive to the prior USB port** (for example, USB port 1) before turning on the computer to speed the boot-up time.
- The display aspect of ASUS Express Gate can be affected due to different monitor specifications. Please adjust the screen resolution using Express Gate Configuration Panel.
- Installation of at least 1GB system memory is recommended for better performance.

The First Screen

Express Gate's first screen appears within a few seconds after you power on the computer.

ASUS Express Gate
Web Search
Click any of the application icons to enter Express Gate environment and launch the selected application
Turn off the computer
Click to immediately enter existing OS, or it will automatically continue booting to existing OS when the timer above the Exit icon counts down to zero (0).

- To enter the motherboard BIOS setup program, click **Exit** on the Express Gate First Screen, and then press the <Del> key during POST.
- See the software manual in the bundled motherboard support DVD or click in the Express Gate environment for detailed software instructions.

Chapter 4

4.3.6 Audio configurations

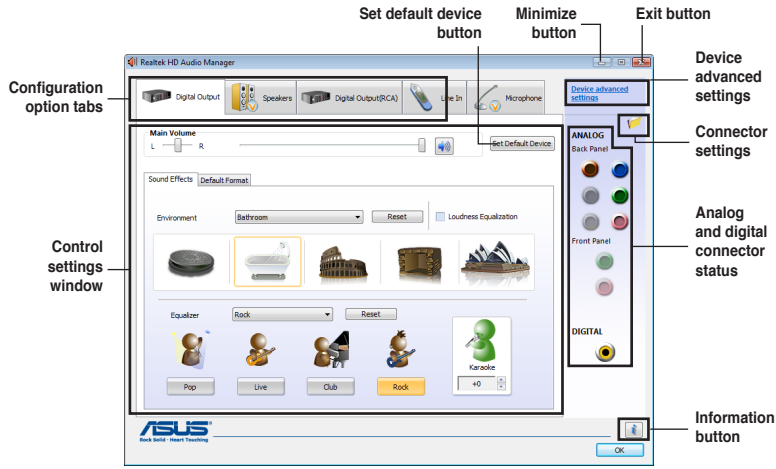
The Realtek® audio CODEC provides 8-channel audio capability to deliver the ultimate audio experience on your computer. The software provides Jack-Detection function, S/PDIF Out support, and interrupt capability. The CODEC also includes the Realtek® proprietary UAJ® (Universal Audio Jack) technology for all audio ports, eliminating cable connection errors and giving users plug and play convenience.

Follow the installation wizard to install the Realtek® Audio Driver from the support CD/DVD that came with the motherboard package.

If the Realtek audio software is correctly installed, you will find the **Realtek HD Audio Manager** icon on the taskbar. Double-click on the icon to display the Realtek HD Audio Manager.

Realtek HD Audio Manager

A. Realtek HD Audio Manager for Windows® Vista™



B. Realtek HD Audio Manager for Windows XP

4.3.7 ASUS GPU Boost

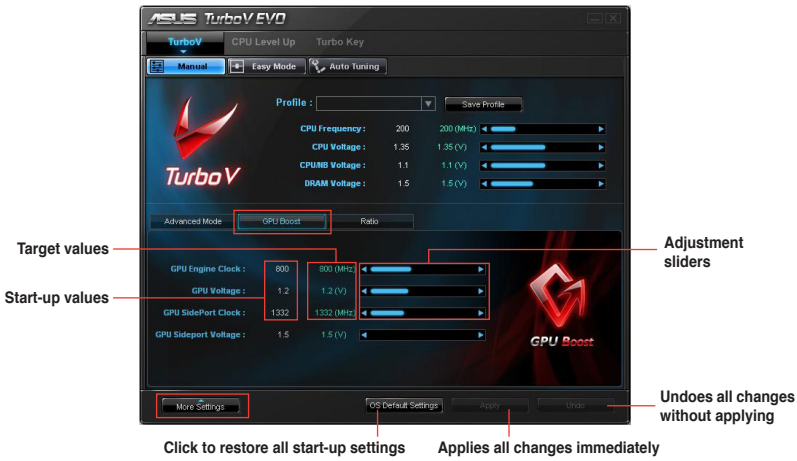
ASUS GPU Boost allows you to overclock the integrated GPU in WIndows® environment and takes effect in real-time without exiting and rebooting the OS.

Refer to the CPU documentation before adjusting the integrated GPU voltage settings. Setting a high voltage may damage the integrated GPU permanently, and setting a low voltage may make the system unstable.

- ASUS GPU Boost is available only when you install the GPU Boost driver from the motherboard support DVD.
- For system stability, all changes made in ASUS GPU Boost will not be saved to BIOS settings and will not be kept on the next system boot. Use the **Save Profile** function to save your customized overclocking settings and manually load the profile after Windows starts.
- When GPU Boost is enabled, ASUS EPU will be set to **High Performance** mode automatically.

To launch ASUS GPU Boost

1. Install the ASUS TurboV EVO utility from the motherboard support DVD.
2. Install the ASUS GPU Boost driver from the motherboard support DVD.
3. Click **start** > **All Programs** > **ASUS** > **TurboV EVO** > **TurboV EVO**.
4. Click **More Settings** from the TurboV EVO main screen, and then click **GPU Boost**.



You can adjust the GPU Engine Clock and GPU Voltage simultaneously in the TurboV **Easy Mode**.

4.4 ASUS Unique Overclocking Utility—TurboV EVO

ASUS TurboV EVO introduces **TurboV, CPU Level UP** and **Turbo Key**—three powerful tools that allow you to overclock your system effectively. Install ASUS TurboV EVO from the support DVD that came with the motherboard package.

If the TurboV EVO is correctly installed, you will find the **TurboV EVO** icon on the Windows® notification area. Click on the icon to display the TurboV EVO control panel.

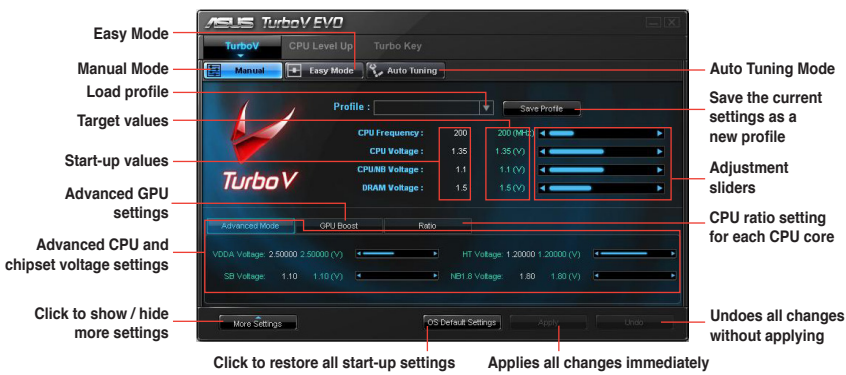
- Refer to the software manual in the support DVD or visit the ASUS website at www.asus.com for detailed software configuration.
- When TurboV EVO is enabled, ASUS EPU will be set to **High Performance** mode automatically.

4.4.1 Using ASUS TurboV

ASUS TurboV allow you to overclock the CPU frequency, CPU voltage, CPU/NB voltage, DRAM voltage, and the integrated GPU voltage/frequency in Windows® environment and takes effect in real-time.

Refer to the CPU documentation before adjusting CPU voltage settings. Setting a high voltage may damage the CPU permanently, and setting a low voltage may make the system unstable.

For system stability, all changes made in ASUS TurboV (except for **Auto Tuning**) will not be saved to BIOS settings and will not be kept on the next system boot. Use the **Save Profile** function to save your customized overclocking settings and manually load the profile after Windows starts.



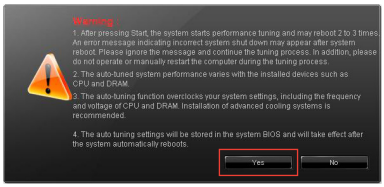
- GPU Boost is available only when you install the GPU Boost driver from the motherboard support DVD.
- For advanced overclock ability, adjust first the BIOS items, and then proceed more detailed adjustments using TurboV.

4.4.2 Using ASUS TurboV Auto Tuning Mode

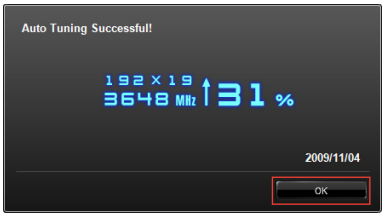
The Auto Tuning Mode allows smart auto-overclocking. Follow the instructions below to let TurboV EVO detect and overclock your system.

1. Click the **Auto Tuning** tab and then click **Start**. You can also click **More Settings** first to configure more overclocking parameters before starting auto-overclocking.

2. Read through the warning messages and click **Yes** to start auto-overclocking.


Warning !
1. After pressing Start, the system starts performance tuning and may reboot 2 to 3 times. An error message indicating incorrect system shut down may appear after system reboot. Please ignore the message and continue the tuning process. In addition, please do not operate or manually restart the computer during the tuning process.
2. The auto-tuned system performance varies with the installed devices such as CPU and DRAM.
3. The auto-tuning function overclocks your system settings, including the frequency and voltage of CPU and DRAM. Installation of advanced cooling systems is recommended.
4. The auto tuning settings will be stored in the system BIOS and will take effect after the system automatically reboots.
Yes
No

3. TurboV automatically overclocks the CPU, saves BIOS settings and restarts the system. After re-entering Windows, a message appears indicating auto tuning success. Click **OK** to exit.

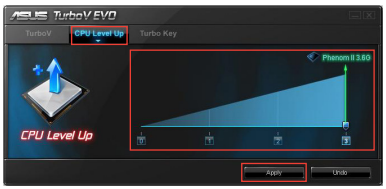


- After pressing **Start**, the system starts performance tuning and may reboot 2 to 3 times. An error message indicating incorrect system shut down may appear after system reboot. Please ignore the message and continue the tuning process. In addition, please do not operate or manually restart the computer during the tuning process.
- The auto-tuned system performance varies with the installed devices such as the CPU and DRAM.
- The auto-tuning function overclocks your system settings, including the frequency and voltage of the CPU and DRAM. Installation of advanced cooling systems is recommended.
- The auto-tuned settings will be stored in system BIOS and will take effect after the system automatically reboots.

4.4.3 Using CPU Level UP

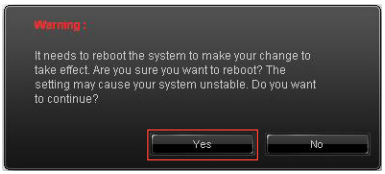
CPU Level UP allows you to upgrade your CPU at no additional cost. Pick a CPU level you want to overclock to, and CPU Level UP will do the rest for you.

1. Click the **CPU Level UP** tab, pick a CPU level you want to overclock to by adjusting the slider, and then click **Apply**.



The CPU options vary depending on the CPU model you install on the motherboard.

2. Read through the warning messages and click **Yes** to start upgrading the CPU and restart the system.


Warning :
It needs to reboot the system to make your change to take effect. Are you sure you want to reboot? The setting may cause your system unstable. Do you want to continue?
Yes
No

4.4.4 Using ASUS Turbo Key

ASUS Turbo Key allows the user to set a group of hotkeys into physical overclocking buttons. After the easy setup, Turbo Key can boost performances without interrupting ongoing work or games—with just one touch!

Configuring ASUS Turbo Key

1. Click the **Turbo Key** tab.
2. Select your desired hotkey combination.
3. You can decide the performance boost level by selecting **Turbo Key Profile**. You can also load personal profiles saved in the TurboV tab.
4. Choose whether to show Turbo Key OSD and status.
5. Click **Apply** to save Turbo Key settings.

You have to press the assigned hotkeys to use the Turbo Key function.

4.5 RAID configurations

The motherboard comes with the AMD® SB850 chipset that allows you to configure Serial ATA hard disk drives as RAID sets. The motherboard supports the following RAID configurations: RAID 0, RAID 1, RAID 5 and RAID 10.

- You must install Windows® XP Service Pack 2 or later versions before using Serial ATA hard disk drives. The Serial ATA RAID feature is available only if you are using Windows® XP SP2 or later versions.
- Due to Windows® XP / Vista / 7 limitation, a RAID array with the total capacity over 2TB cannot be set as a boot disk. A RAID array over 2TB can only be set as a data disk only.
- If you want to install a Windows® operating system to a hard disk drive included in a RAID set, you have to create a RAID driver disk and load the RAID driver during OS installation. Refer to section **4.6 Creating a RAID driver disk** for details.

4.5.1 RAID definitions

RAID 0 (Data striping) optimizes two identical hard disk drives to read and write data in parallel, interleaved stacks. Two hard disks perform the same work as a single drive but at a sustained data transfer rate, double that of a single disk alone, thus improving data access and storage. Use of two new identical hard disk drives is required for this setup.

RAID 1 (Data mirroring) copies and maintains an identical image of data from one drive to a second drive. If one drive fails, the disk array management software directs all applications to the surviving drive as it contains a complete copy of the data in the other drive. This RAID configuration provides data protection and increases fault tolerance to the entire system. Use two new drives or use an existing drive and a new drive for this setup. The new drive must be of the same size or larger than the existing drive.

RAID 5 stripes both data and parity information across three or more hard disk drives. Among the advantages of RAID 5 configuration include better HDD performance, fault tolerance, and higher storage capacity. The RAID 5 configuration is best suited for transaction processing, relational database applications, enterprise resource planning, and other business systems. Use a minimum of three identical hard disk drives for this setup.

RAID 10 is data striping and data mirroring combined without parity (redundancy data) having to be calculated and written. With the RAID 10 configuration you get all the benefits of both RAID 0 and RAID 1 configurations. Use four new hard disk drives or use an existing drive and three new drives for this setup.

4.5.2 Installing Serial ATA hard disks

The motherboard supports Serial ATA hard disk drives. For optimal performance, install identical drives of the same model and capacity when creating a disk array.

To install the SATA hard disks for a RAID configuration:

1. Install the SATA hard disks into the drive bays.
2. Connect the SATA signal cables.
3. Connect a SATA power cable to the power connector on each drive.

4.5.3 Setting the RAID item in BIOS

You must enable the RAID function in the BIOS Setup before creating RAID volume(s) using SATA HDDs. To do this:

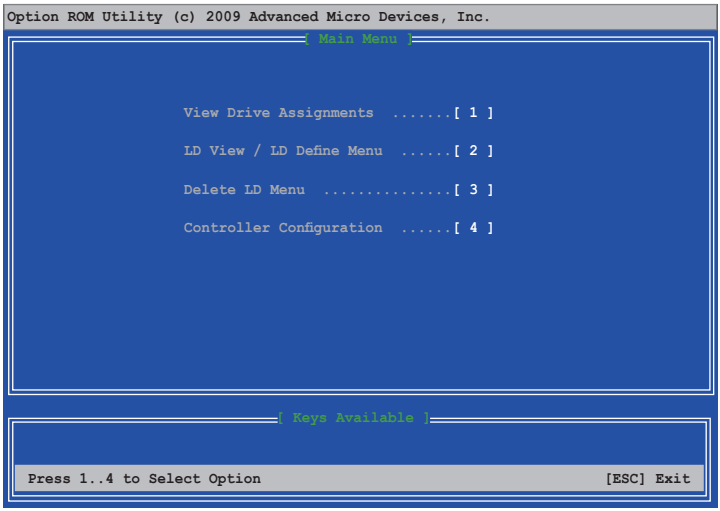
1. Enter the BIOS Setup during POST.
2. Go to the **Main** menu > **SATA Configuration**, and then press **<Enter>**.
3. Set the type of the SATA connectors to **[RAID]**.
4. Save your changes, and then exit the BIOS Setup.

See section **3.4.2 SATA Configuration** for details.

4.5.4 AMD® Option ROM Utility

To enter the AMD® Option ROM utility:

1. Boot up your computer.
2. During POST, press <Ctrl> + <F> to display the utility main menu.


Option ROM Utility (c) 2009 Advanced Micro Devices, Inc.
[Main Menu]
View Drive Assignments .....[1]
LD View / LD Define Menu .....[2]
Delete LD Menu .....[3]
Controller Configuration .....[4]
[Keys Available]
Press 1..4 to Select Option
[ESC] Exit

The Main Menu allows you to select an operation to perform. The Main Menu options include:

- **View Drive Assignments:** shows the status of the hard disk drives.
- **LD View / LD Define Menu:** displays the existing RAID set information / creates a RAID 0, RAID 1, RAID 5 or RAID 10 configuration.
- **Delete LD Menu:** deletes a selected RAID set and partition.
- **Controller Configuration:** shows the system resources configuration.

Press <1>, <2>, <3>, or <4> to enter the option you need; press <ESC> to exit the utility.

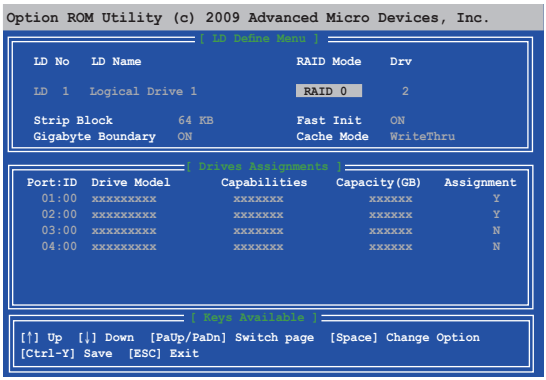
The RAID BIOS setup screens shown in this section are for reference only, and may not exactly match the items on your screen.

To create a RAID volume using more than four hard disk drives, ensure that the SATA connectors 5/6 are set to [RAID] mode.

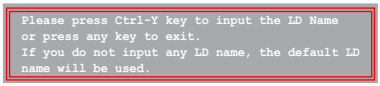
Creating a RAID volume

To create a RAID volume:

1. In the Main Menu, press <2> to enter the **LD View / LD Define Menu** function.
2. Press <Ctrl> + <C>, and the following screen appears.

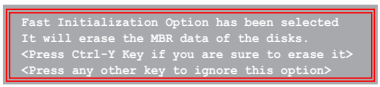

Option ROM Utility (c) 2009 Advanced Micro Devices, Inc.
[LD Define Menu]
LD No LD Name RAID Mode Drv
LD 1 Logical Drive 1 RAID 0 2
Strip Block 64 KB Fast Init ON
Gigabyte Boundary ON Cache Mode WriteThru
[Drives Assignments]
Port:ID Drive Model Capabilities Capacity(GB) Assignment
01:00 xxxxxxxxx xxxxxxx xxxxxx Y
02:00 xxxxxxxxx xxxxxxx xxxxxx Y
03:00 xxxxxxxxx xxxxxxx xxxxxx N
04:00 xxxxxxxxx xxxxxxx xxxxxx N
[Keys Available]
[↑] Up [↓] Down [PaUp/PaDn] Switch page [Space] Change Option
[Ctrl-Y] Save [ESC] Exit

3. Move to the **RAID Mode** item and press <Space> to select a RAID mode to create.
4. Move to the **Assignment** item by using the down arrow key and set **Y** to select the hard disk drives you want to include in the RAID set.
5. Press <Ctrl> + <Y> to save the setting.
6. The utility prompts the following message. Press <Ctrl> + <Y> to input the LD name.


Please press Ctrl-Y key to input the LD Name
or press any key to exit.
If you do not input any LD name, the default LD
name will be used.

7. Eenter an LD name, and then press any key to continue.

8. Press <Ctrl> + <Y> to erase the MBR, or you may press any key to abort the settings.



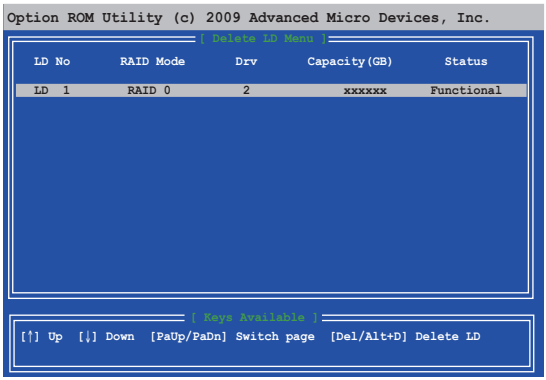
9. Press <Ctrl> + <Y> to enter the screen to modify the array capacity, or press any key to use the maximum capacity.

Deleting a RAID configuration

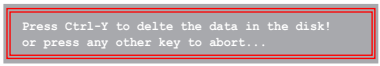
Take caution when deleting a RAID volume. You will lose all data on the hard disk drives when you delete a RAID volume.

To delete a RAID volume:

1. In the Main Menu, press <3> to enter the **Delete LD** function.
2. Select the RAID item you want to delete and press <Del> or <Alt> + <D>.


Option ROM Utility (c) 2009 Advanced Micro Devices, Inc.
[Delete LD Menu]
LD No RAID Mode Drv Capacity(GB) Status
LD 1 RAID 0 2 xxxxxx Functional
[Keys Available]
[↑] Up [↓] Down [PaUp/PaDn] Switch page [Del/Alt+D] Delete LD

3. The utility prompts the following messages:

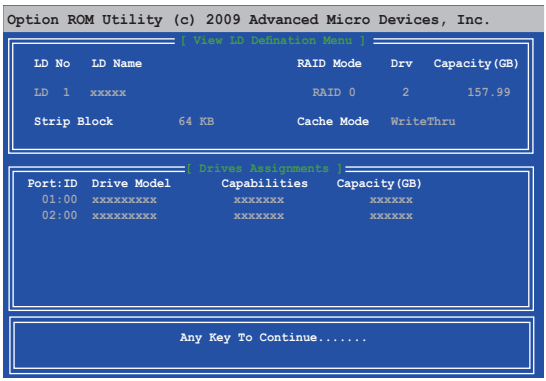


Press <Ctrl> + <Y> to delete the RAID volume.

Dispalying a RAID set information

To display a RAID set information:

1. In the Main Menu, press <2> to enter the “LD View / LD Define Menu” function.
2. Select a RAID item and press <Enter> to display its information.


Option ROM Utility (c) 2009 Advanced Micro Devices, Inc.
[View LD Defination Menu]
LD No LD Name RAID Mode Drv Capacity(GB)
LD 1 xxxxx RAID 0 2 157.99
Strip Block 64 KB Cache Mode WriteThru
[Drives Assignments]
Port:ID Drive Model Capabilities Capacity(GB)
01:00 xxxxxxxxx xxxxxxx xxxxxx
02:00 xxxxxxxxx xxxxxxx xxxxxx
Any Key To Continue.....

4.6 Creating a RAID driver disk

A floppy disk with the RAID driver is required when installing Windows® XP operating system on a hard disk drive that is included in a RAID set. For Windows® Vista or later operating systems, use either a USB flash drive with the RAID driver or the support DVD.

- **The motherboard does not provide a floppy drive connector**. You have to use a USB floppy disk drive when creating a SATA RAID driver disk.
- Windows® XP may not recognize the USB floppy disk drive due to Windows® XP limitation. To work around this OS limitation, refer to section **4.6.4 Using a USB floppy disk drive**.

4.6.1 Creating a RAID driver disk without entering the OS

To create a RAID driver disk without entering the OS

1. Boot your computer.
2. Press <Del> during POST to enter the BIOS setup utility.
3. Set the optical drive as the primary boot device.
4. Insert the support DVD into the optical drive.
5. Save changes and exit BIOS.
6. When the **Make Disk** menu appears, press <1> to create a RAID driver disk.
7. Insert a formatted floppy disk into the USB floppy disk drive, then press <Enter>.
8. Follow the succeeding screen instructions to complete the process.

4.6.2 Creating a RAID driver disk in Windows®

To create a RAID driver disk in Windows®:

1. Start Windows®.
2. Plug the USB floppy disk drive and insert a floppy disk.
3. Place the motherboard support DVD into the optical drive.
4. Go to the **Make Disk** menu, and then click **AMD AHCI/RAID 32/64bit xxxx Driver** to create a RAID driver disk.
5. Select USB floppy disk drive as the destination disk.
6. Follow the succeeding screen instructions to complete the process.

Write-protect the floppy disk to avoid a computer virus infection.

4.6.3 Installing the RAID driver during Windows® OS installation

If you use a SATA optical drive to run the OS installation disk, we strongly recommend that you install the optical dirve to the SATA connectors 5/6 and set them to [IDE] mode.

To install the RAID driver for Windows® XP

1. During the OS installation, the system prompts you to press the F6 key to install third-party SCSI or RAID driver.
2. Press <F6>, and then insert the floppy disk with RAID driver into the USB floppy disk drive.

3. When prompted to select the SCSI adapter to install, select the RAID driver for the corresponding OS version.
4. Follow the succeeding screen instructions to complete the installation.

To install the RAID driver for Windows® Vista or later OS

1. During the OS installation, click L**oad Driver** to allow you to select the installation media containing the RAID driver.
2. Insert the USB flash drive with RAID driver into the USB port or the support DVD into the optical drive, and then click **Browse**.
3. Click the name of the device you've inserted, go to **Drivers** > **RAID**, and then select the RAID driver for the corresponding OS version. Click **OK**.
4. Follow the succeeding screen instructions to complete the installation.

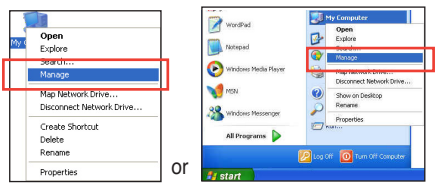
Before loading the RAID driver from a USB flash drive, you have to use another computer to copy the RAID driver from the support DVD to the USB flash drive.

4.6.4 Using a USB floppy disk drive

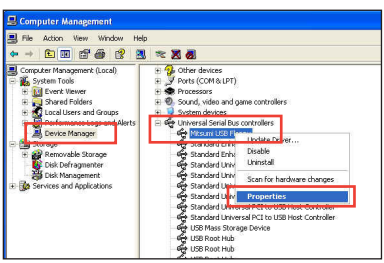
Due to OS limitation, Windows® XP may not recognize the USB floppy disk drive when you install the RAID driver from a floppy disk during the OS installation.

To solve this issue, add the USB floppy disk drive's Vendor ID (VID) and Product ID (PID) to the floppy disk containing the RAID driver. Refer to the steps below:

1. Using another computer, plug the USB floppy disk drive, and insert the floppy disk containing the RAID driver.
2. Right-click **My Computer** on the Windows® desktop or **start** menu, and then select **Manage** from the pop-up window.

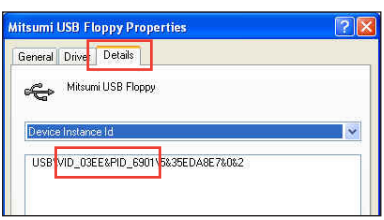


3. Select **Device Manager**. From the **Universal Serial Bus controllers**, right-click **xxxxxx USB Floppy**, and then select **Properties** from the pop-up window.

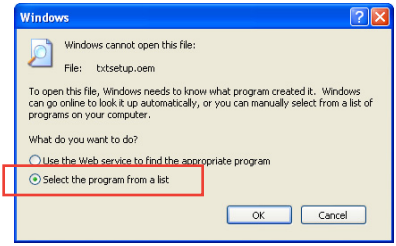


The name of the USB floppy disk drive varies with different vendors.

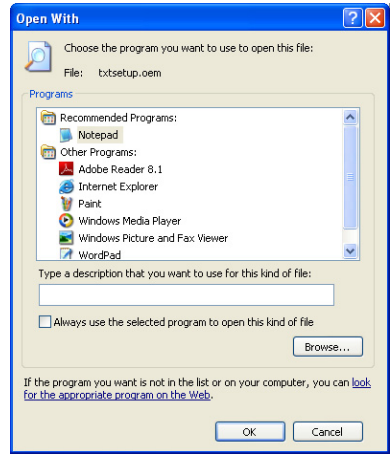
4. Click **Details** tab. The Vendor ID (VID) and Product ID (PID) are displayed.



5. Browse the contents of the RAID driver disk to locate the file **txtsetup.oem**.
6. Double-click the file. A window appears, allowing you to select the program for opening the oem file.


Windows
Windows cannot open this file:
File: txtsetup.oem
To open this file, Windows needs to know what program created it. Windows can go online to look it up automatically, or you can manually select from a list of programs on your computer.
What do you want to do?
Use the Web service to find the appropriate program
Select the program from a list
OK
Cancel

7. Use Notepad to open the file.


Open With
Choose the program you want to use to open this file:
File: txtsetup.oem
Programs
Recommended Programs:
Notepad
Other Programs:
Adobe Reader 8.1
Internet Explorer
Paint
Windows Media Player
Windows Picture and Fax Viewer
WordPad
Type a description that you want to use for this kind of file:
Always use the selected program to open this kind of file
Browse...
If the program you want is not in the list or on your computer, you can look for the appropriate program on the Web.
OK
Cancel

8. Find the **[HardwareIds.SCSI.Napa_i386_ahci8086]** and **[HardwareIds.SCSI.Napa_amd64_ahci]** sections in the **txtsetup.oem** file.
9. Type the following line to the bottom of the two sections:
id = "USB\VID_xxxx&PID_xxxx", "usbstor"

```
[HardwareIds.SCSI.Napa_i386_ahci8086]
id= "PCI\VEN_1002&DEV_4392&CC_0104","ahcix86"
id= "PCI\VEN_1002&DEV_4391&CC_0106","ahcix86"
id= "PCI\VEN_1002&DEV_4393&CC_0104","ahcix86"
id= "USB\VID_03EE&PID_6901", "usbstor"

[HardwareIds.SCSI.Napa_amd64_ahci]
id= "PCI\VEN_1002&DEV_4392&CC_0104","ahcix64"
id= "PCI\VEN_1002&DEV_4391&CC_0106","ahcix64"
id= "PCI\VEN_1002&DEV_4393&CC_0104","ahcix64"
id= "USB\VID_03EE&PID_6901", "usbstor"
```

Add the same line to both sections.

The VID and PID vary with different vendors.

10. Save and exit the file.

5.1 ATI® CrossFireX™ technology

The motherboard supports the ATI® CrossFireX™ technology that allows you to install multi-graphics processing units (GPU) graphics cards. Follow the installation procedures in this section.

5.1.1 Requirements

- Prepare two identical CrossFireX-ready graphics cards or one CrossFireX-ready dual-GPU graphics card that are ATI® certified.
- Ensure that your graphics card driver supports the ATI CrossFireX technology. Download the latest driver from the AMD website at www.amd.com.
- Ensure that your power supply unit (PSU) can provide at least the minimum power required by your system. See Chapter 2 for details.

- We recommend that you install additional chassis fans for better thermal environment.
- Visit the AMD ATI website for the latest graphics card support list.

5.1.2 Before you begin

For ATI CrossFireX to work properly, you have to uninstall all existing graphics card drivers before installing ATI CrossFireX graphics cards to your system.

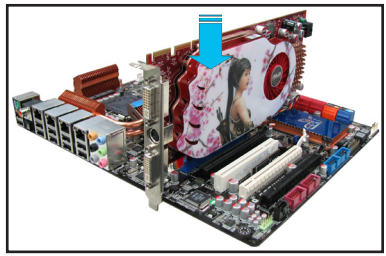
To uninstall all existing graphics card drivers:

1. Close all current applications.
2. For Windows XP, go to **Control Panel > Add/Remove Programs**.
   For Windows Vista / 7, go to **Control Panel > Programs and Features**.
3. Select your current graphics card drivers.
4. For Windows XP, select **Add/Remove**.
   For Windows Vista / 7, select **Uninstall**.
5. Turn off your computer.

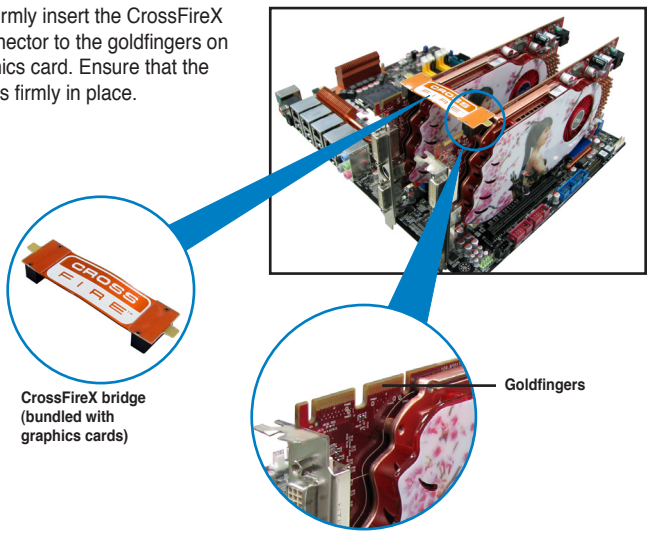
5.1.3 Installing two CrossFireX™ graphics cards

The following pictures are for reference only. The graphics cards and the motherboard layout may vary with models, but the installation steps remain the same.

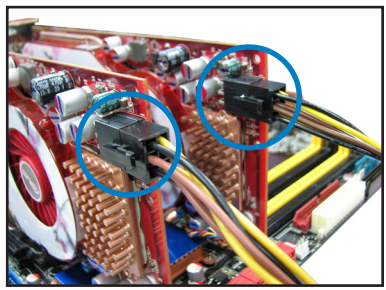
1. Prepare two CrossFireX-ready graphics cards.
2. Insert the two graphics card into the PCIEX16 slots. If your motherboard has more than two PCIEX16 slots, refer to Chapter 2 in this user manual for the locations of the PCIEX16 slots recommended for multi-graphics card installation.
3. Ensure that the cards are properly seated on the slots.



4. Align and firmly insert the CrossFireX bridge connector to the goldfingers on each graphics card. Ensure that the connector is firmly in place.



5. Connect two independent auxiliary power sources from the power supply to the two graphics cards separately.
6. Connect a VGA or a DVI cable to the graphics card.



5.1.4 Installing the device drivers

Refer to the documentation that came with your graphics card package to install the device drivers.

Ensure that your PCI Express graphics card driver supports the ATI® CrossFireX™ technology. Download the latest driver from the AMD website (www.amd.com).

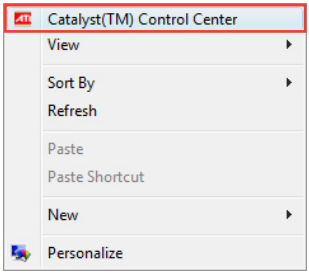
5.1.5 Enabling the ATI® CrossFireX™ technology

After installing your graphics cards and the device drivers, enable the CrossFireX™ feature through the ATI Catalyst™ Control Center in Windows environment.

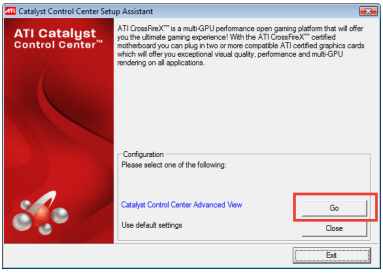
Launching the ATI Catalyst Control Center

To launch the ATI Catalyst Control Center

1. Right-click on the Windows® desktop and select **Catalyst(TM) Control Center**. You can also right-click the ATI icon in the Windows notification area and select **Cayalist Control Center**.



2. The **Catalyst Control Center Setup Assistant** appears when the system detects the existance of multi-graphics cards. Click **Go** to continue to the **Catalyst Control Center Advanced View** window.



Enabling CrossFireX settings

1. In the Catalyst Control Center window, click **Graphics Settings > CrossFireX > Configure**.
2. From the Graphics Adapter list, select the graphics card to act as the display GPU.
3. Select **Enable CrossFireX**.
4. Click **Apply**, and then click **OK** to exit the window.

5.2 ATI® Hybrid CrossFireX™ technology

The motherboard supports the ATI® Hybrid CrossFireX™ technology that allows you to install multi-graphics processing units (GPU) CrossFireX cards.

5.2.1 System requirements

Before using ATI Hybrid CrossFireX, ensure that your system meets the following basic requirements:

- Operating System: Windows® Vista / 7
- Memory capacity: Minimum 1GB
- CPU: AM3
- On-board graphics card RAM: 256MB

Visit the AMD ATI website for the latest graphics card support list.

5.2.2 Before you proceed

Configure the BIOS settings for the graphics card to support ATI Hybrid CrossFireX.

To set Internal Graphics:

1. Press **<Del>** during the Power-On-Self-Test (POST) to enter the BIOS Setup utility.
2. Go to **Advanced > Chipset > Internal Graphics**, set **UMA Frame Buffer Size** to **[256M]** or above and **Surround View** to **[Enabled]**.
3. Press **<F10>** to save the changes and exit BIOS settings. Select **OK** to confirm.

5.2.3 Installing AMD Chipset Driver

To install the driver that supports Hybrid CrossFireX technology:

1. Insert the Support DVD that comes with your motherboard into the optical drive. The DVD automatically displays the Highlights menu if Autorun is enabled on your computer.

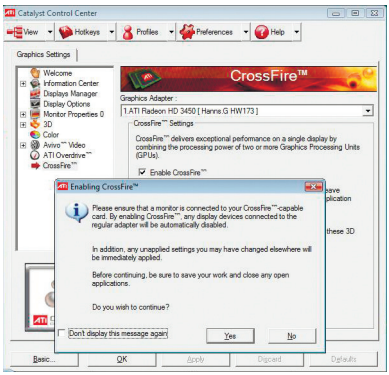
If Autorun is NOT enabled in your computer, browse the contents of the support DVD to locate the file ASSETUP.EXE from the BIN folder. Double-click the ASSETUP.EXE to run the DVD.

2. From the Drivers menu, click **AMD Chipset Driver** to install it. Follow the onscreen instructions to finish the installation.
3. Restart your computer after the installation is completed.
4. When the system restarts, wait for a few seconds for the driver to load automatically.

5.2.4 Using the ATI® CATALYST® Control Center

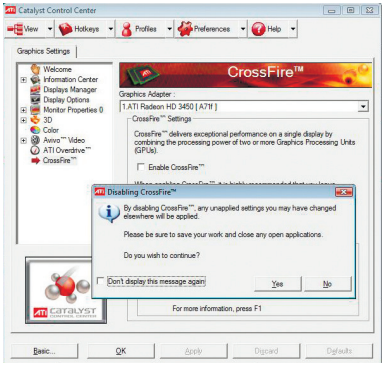
Using an add-on graphics card

1. Install a graphics card onto your motherboard. Refer to the User Guide that comes with your graphics card for details.
2. Right-click on the Windows® desktop, then click **ATI CATALYST(R) Control Center** from the shortcut menu. The ATI CATALYST Control Center screen appears.
3. Click **Graphics Settings** > **CrossFire™**, then select the **Enable CrossFire™** check box. When a confirmation message pops up, click **Yes**. The screen blacks out for about one minute.
4. Click **OK**. The add-on graphics card is set to be the main monitor.

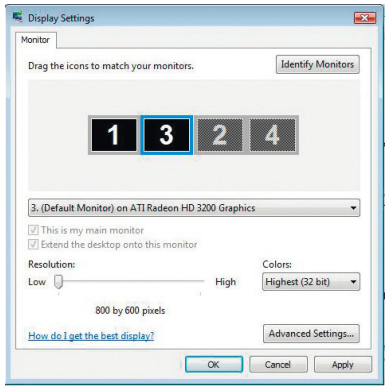


Using the onboard graphics card

1. Right-click on the Windows® desktop, and then click **ATI CATALYST(R) Control Center** from the shortcut menu. The ATI CATALYST Control Center screen appears.
2. Click **Graphics Settings > CrossFire™**, then clear the **Enable CrossFire™** check box. When a confirmation message pops up, click **Yes**. The screen blacks out for about one minute.
3. Click **OK**.



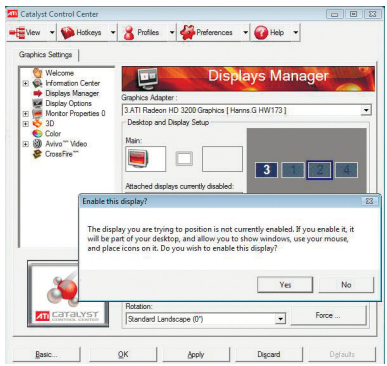
4. Right-click on the Windows® desktop, then click **Personalize** from the shortcut menu.
5. Click **Display Settings**. Select **[Default Monitor] on ATI Radeon HD 4250 Graphics**, then select the check boxes of **This is my main monitor** and **Extend the desktop onto this monitor**. Click **OK**, and then **Yes** from the confirmation window.
6. Restart the system. Right-click on the Windows® desktop, then click **ATI CATALYST(R) Control Center** from the shortcut menu. The ATI CATALYST Control Center screen appears.



7. Click **Graphics Settings** > **CrossFire™**, then select the **Enable CrossFire™** check box. When a confirmation pops up, click **Yes**. The screen blacks out for about one minute.
8. Click **OK**. The onboard graphics card is set to be the main monitor.

If you are using both an add-on and the on-board graphics cards at same time and want to set the onboard graphics card as your main monitor, follow the below instructions.

1. Follow steps 1 to 3 on **Using the onboard graphics card**.
2. From the ATI CATALYST(R) Control Center screen, click **Display Manager** > **Graphics Adapter**. Select **ATI Radeon HD 4250 Graphics [Gabbs, G HW173]**. Click **OK**, and then **Yes** from the confirmation window.
3. Follow steps 6 to step 8 on **Using the onboard graphics card** to complete the process of setting up the onboard graphics card as your main monitor.



ASUS contact information

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Online contact	www.asus.de/sales

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Telephone (System/Notebook/Eee/LCD)	+49-1805-010920*
Support Fax	+49-2102-9599-11
Online support	support.asus.com

* EUR 0.14/minute from a German fixed landline; EUR 0.42/minute from a mobile phone.

DECLARATION OF CONFORMITY

Per FCC Part 2 Section 2. 1077(a)

Responsible Party Name: **Asus Computer International**

Address: **800 Corporate Way, Fremont, CA 94539.**

Phone/Fax No: **(510)739-3777/(510)608-4555**

hereby declares that the product

Product Name : Motherboard

Model Number : M4A88TD-V EVO

Conforms to the following specifications:

- ☒ FCC Part 15, Subpart B, Unintentional Radiators
- ☐ FCC Part 15, Subpart C, Intentional Radiators
- ☐ FCC Part 15, Subpart E, Intentional Radiators

Supplementary Information:

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Representative Person's Name : **Steve Chang / President**

Signature :

Date : **Mar. 14, 2010**

EC Declaration of Conformity

ASUS Inspiring Innovation • Persistent Perfection

We, the undersigned,

Manufacturer:	ASUSTek COMPUTER INC.
Address, City:	No. 150, LI-TE RD., PEITOU, TAIPEI 112, TAIWAN R.O.C.
Country:	TAIWAN
Authorized representative in Europe:	ASUS COMPUTER GmbH
Address, City:	HARKORT STR. 21-23, 40880 RATINGEN
Country:	GERMANY

declare the following apparatus:

Product name :	**Motherboard**
Model name :	**M4A88TD-V EVO**

conform with the essential requirements of the following directives:

☒2004/108/EC-EMC Directive

☒ EN 55022:2006+A1:2007	☒ EN 55024:1998+A1:2001+A2:2003
☒ EN 61000-3-2:2006	☒ EN 61000-3-3:1995+A1:2001+A2:2005
☐ EN 55013:2001+A1:2003+A2:2006	☐ EN 55020:2007

☐1999/5/EC-R &TTE Directive

☐ EN 300 328 V1.7.1(2006-05)	☐ EN 301 489-1 V1.8.1(2008-04)
☐ EN 300 440-1 V1.4.1(2008-05)	☐ EN 301 489-3 V1.4.1(2002-08)
☐ EN 300 440-2 V1.2.1(2008-03)	☐ EN 301 489-4 V1.3.1(2002-08)
☐ EN 301 511 V9.0.2(2003-03)	☐ EN 301 489-7 V1.3.1(2005-11)
☐ EN 301 908-1 V3.2.1(2007-05)	☐ EN 301 489-9 V1.4.1(2007-11)
☐ EN 301 908-2 V3.2.1(2007-05)	☐ EN 301 489-17 V1.3.2(2008-04)
☐ EN 301 893 V1.4.1(2005-03)	☐ EN 301 489-24 V1.4.1(2007-09)
☐ EN 50360:2001	☐ EN 302 326-2 V1.2.2(2007-06)
☐ EN 50371:2002	☐ EN 302 326-3 V1.3.1(2007-09)

☒2006/95/EC-LVD Directive

☒ EN 60950-1:2001+A11:2004	☐ EN60065:2002+A1:2006
☐ EN 60950-1:2006	

☐2005/32/EC-EuP Directive

Regulation (EC) No. 1275/2008	Regulation (EC) No. 278/2009
☐ EN 62301:2005	☐ EN 62301:2005

☒CE marking

CE (EC conformity marking)

Position : **CEO**

Name : **Jerry Shen**

Declaration Date: Mar. 14, 2010

Year to begin affixing CE marking:2010

Signature : _____